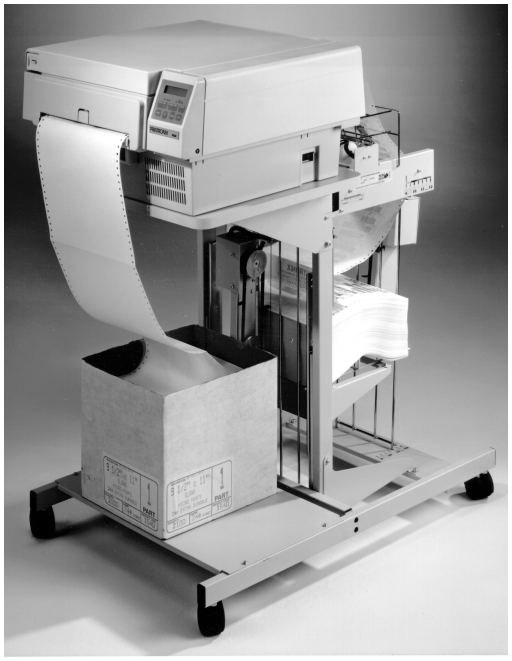
PRINTRONIX®

Setup Guide



L1524 Continuous Form Laser Printer

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L1524 Laser Printer
Setup Guide

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172060–001E

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Federal Communications Commission (FCC) Statement: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provided reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

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German Conformity Statement:
Zulassungsbescheinigung Gesetz über die elektromagnetische Verträglichkeit von Geraten (EMVG) vom 30. August 1995

Dieses Gerät ist berechtigt in Übereinstimmung mit dem deutschen das EG–Konformitätszelchen – CE – zu führen.

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Informationen in Hinsicht EMVG Paragraph 3 Abs. (2) 2:

Das Gerät erfüllt die Schutzanforderungen nach EN 50082–1 und EN 55022 Klasse A.

EN 55022 Klasse A Geräte bedürfen folgender Hinweise:

Nach dem EMVG: "Geräte dürfen an Orten, für die sie nicht asreichend entstört sind, nur mit besonderer Genehmigung des Bundesminesters für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind." (Auszug aus dem EMVG, Paragraph 3, Abs. 4) Dieses Genehmigungsverfahren ist nach Paragraph 9 EMVG in Verbindung mit der entsprechenden Kostenverordnung (Amtsblatt 14/93) kostenpflichtig.

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This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

Warning

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PRINTRONIX®
14600 Myford Road, P.O. Box 19559
Irvine, California 92623
Telephone (714) 368–2300 FAX (714) 368–2600
Customer Solutions Center (714) 368–2686

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About This Manual

This manual is divided into chapters that contain all the information required to use the printer.

Chapter 1: Introduction. General information about the manual and the printer, safety precautions, and component locations.

Chapter 2: Setting Up the Printer. Procedures for installing the printer and its components.

Chapter 3: Configuring the Printer. Configuration menus, options, and factory default settings.

Chapter 4: Diagnostics and Troubleshooting. Diagnostics and procedures for clearing paper jams, cleaning the printer, and interpreting the displayed error messages.

Appendix A: Specifications

Appendix B: Host I/O Interfaces

Appendix C: Media Requirements

How to Locate Information

You can locate specific procedures and information three ways:

- Use the **Table of Contents** at the front of the manual.
- Use the **Chapter Contents** list on the first page of each chapter.
- Use the **Index** at the back of the manual.

Warnings and Special Information

For your safety and to protect valuable equipment, it is very important that you read and comply with all information highlighted under special headings:

WARNING

Describes conditions that could harm you.

VORSICHT

Unter Vorsicht werden Bedingungen beschrieben, die zu Personen.

AVERTISSEMENT

Les Avertissements decrivént les conditions pouvant occasionner des dommages corporels.

AVVERTENZA

Avvertenza descrive le condizioni che possono essere cause di rischio per l'operatore.

PRECAUCION

Describen situaciones que podrían causar daños al usuario.

CAUTION

Conditions that could damage the printer or related equipment.

IMPORTANT

Information vital to proper operation of the printer.

NOTE: Information and helpful tips about printer operation.

Conventions

Throughout this manual, keys and possible key settings are printed in UPPERCASE type.

In most cases, messages displayed in the LCD are shown in the following format:

```
OFFLINE
PAPER CONTROL
```

In some cases, display messages may be shown in UPPERCASE type, surrounded by quotation marks.

The Printer

The printer is a programmable non-impact printer. The printing technique is a plain paper electrophotographic process, that uses a laser diode. Printer emulations and font software download into the printer via the host printer I/O interface.

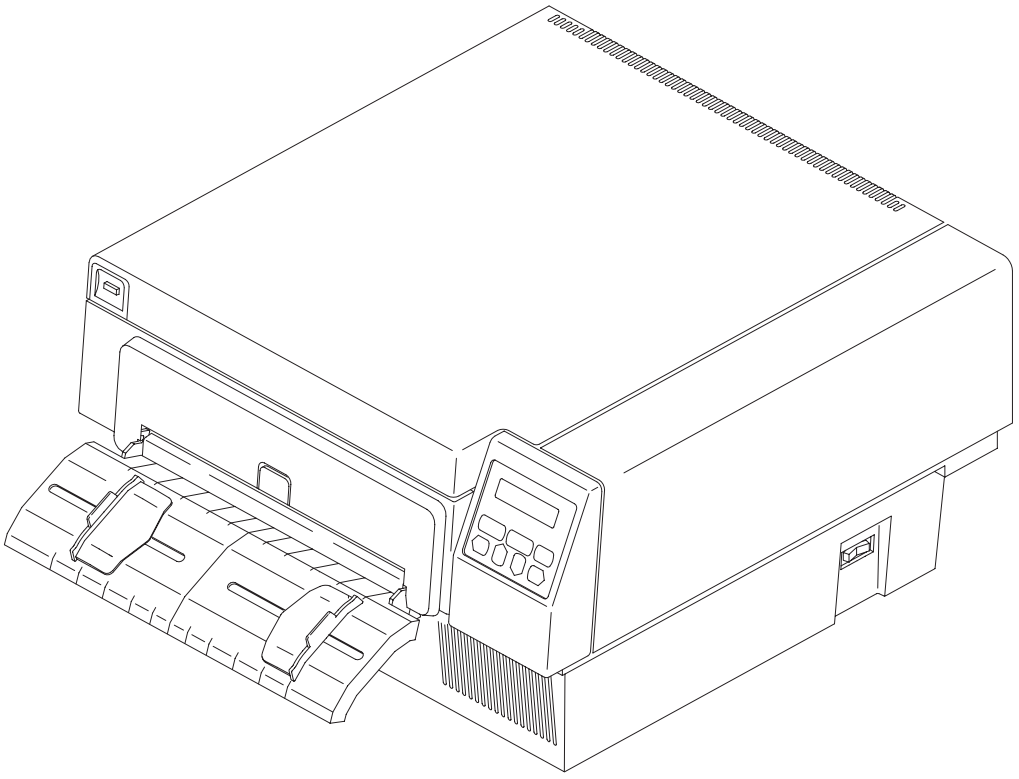

Figure 1–1. The Printer

Printer Features

The printer prints up to 24 pages per minute on an 8.5 x 11 inch page and produces a 300 x 300 dots-per-inch (dpi) resolution on a continuous length printable area. (See Appendix A for printer specifications.)

Features of the printer include:

- Continuous fanfold paper or forms handling
- Supports a wide variety of form lengths
- User-replaceable developer kit, toner kit, and organic photoconductor (OPC) drum kit
- Alphanumeric liquid-crystal display that provides operating and error messages
- Serial and parallel interface
- Coax or twinax interface (optional)
- PrintNet® Ethernet™ LAN interface (optional)

Emulations

The printer comes with HP® Laserjet® PCL5® and/or the Printronix LinePrinter Plus® emulation. The LinePrinter Plus emulation includes the following printer protocols:

- Printronix P-Series
- Printronix P-Series XQ
- Serial Matrix
- Proprinter® III XL
- Epson® FX-1050

LinePrinter plus provides portrait and landscape image orientation. The emulation also offers scalable fonts.

Optional emulations are also available. Refer to the appropriate emulation manual for specific information on these emulations:

- IGP®/PGL®
- IGP/VGL
- PCL5®
- IPDS™
- CTHI

Hardware Options

Ask your printer representative about these options which can enhance your printer's versatility:

- Paper stacker with printer stand

The paper stacker provides for properly stacked paper from the beginning to completion of the print job. The stacker will hold an entire box of media.

- Memory expansion (32 meg and 64 meg)

The L1524 has 32 meg of memory factory installed.

- Flash memory which may store configurations in NVRAM, emulations, fonts and logos.

The L1524 has 8MB of flash memory in its base configuration. 16, 32, or 64MB modules are also available.

- PrintNet Ethernet LAN connection

A hardware option is available for proper connection of the printer to a LAN. This option is sometimes referred to as the NIC (Network Interface Card).

- Coax/Twinax connection

A hardware option is available for proper connection of the printer for Coax/Twinax operation.

- Optional fonts

Optional printer fonts can be purchased and downloaded into the printer using a diskette.

Fonts and Forms

The printer provides a variety of resident fonts. The available fonts are dependent the emulation used. For example, the Printronix LinePrinter Plus emulation provides Letter Gothic, Courier, OCR-A, and OCR-B as standard fonts sets.

Additional fonts can be downloaded from the host computer into printer memory. Once loaded, these additional fonts are accessed in the same way as the resident fonts.

Forms may be stored together with fonts. The storage space for forms and fonts depends on memory availability. Different fonts and forms may be used depending on the emulation installed.

General Laser Printer Technology

The operation of a laser printer is somewhat different than that of an impact printer. They produce an entire page at once, compared to line printers, which produce complete character lines.

NOTE: If the software application fails to give a form feed at the end of the data, and the data does not exceed the selected lines per page setting, the page will not print. Rather, it will remain in memory.

The laser printer has two basic functional parts: the engine and the controller. The engine is responsible for the mechanical aspects of producing the page. The controller controls the printer and is responsible for electronic data manipulations.

NOTE: Laser printers can not print to the physical edge of the paper. If the document image runs to the edge of the paper, portions of the image may be lost.

The electrophotographic printing process, shown in Figure 1–2, consists of the following steps:

1. **Charging**: The charge corona is a thin wire electrode that extends across the width of the media. This electrode places a high–voltage electrostatic charge on the organic photoconductor (OPC) drum.

2. **Imaging**: Based on data received from the host computer, a bit–mapped image of the page is generated in random access memory (RAM) on the controller (not shown).

3. **Exposing**: The laser scanning unit (LSU) exposes areas of the OPC which are to be imaged (i.e., black). This forms a latent image of the bit–mapped data. This image is made up of charged and uncharged areas.

4. **Developing**: The latent image areas of the OPC attract toner from the developer unit to form the developed image on the OPC drum. Since the charged areas of the drum have the same charge as the toner, they repel the toner.

5. **Transferring**: Another thin wire electrode, the transfer corona, puts a high electrostatic charge on the paper. This charge attracts the toner, transferring the toner from the OPC drum to the paper.

6. **Fusing**: Heat and pressure rollers fuse the transferred image to the paper.

7. **Cleaning**: As the OPC drum continues to turn, erase lamps remove all residual electrostatic charge from the OPC. The cleaning unit then removes unused toner from the OPC.

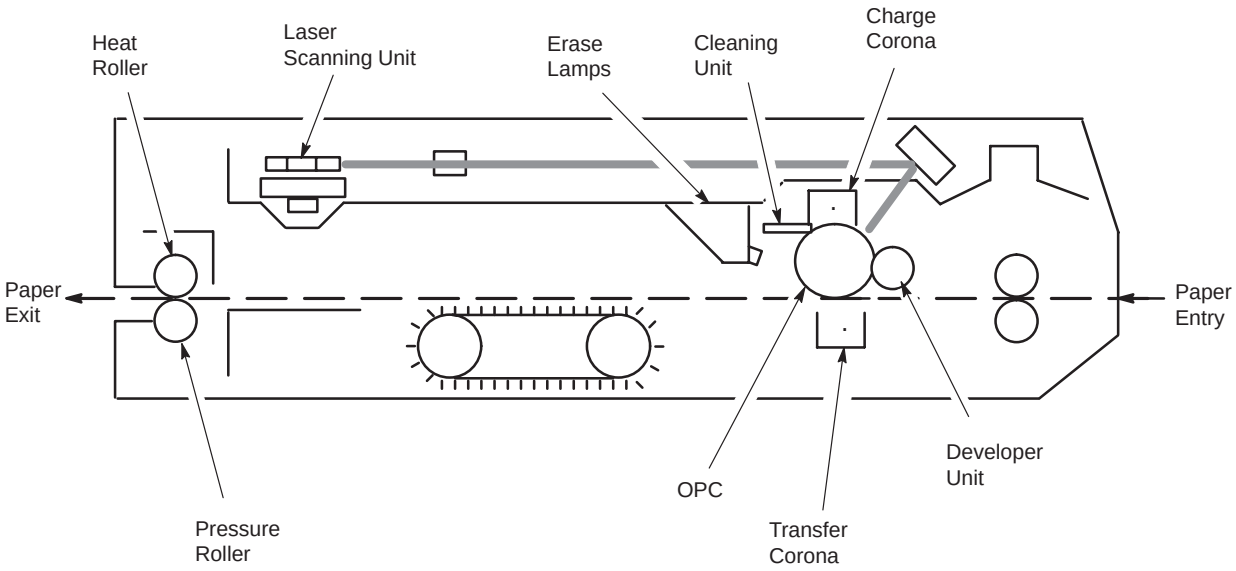

Figure 1–2. The Printing Process

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Safety Precautions

WARNING

The use of controls or adjustments or the performance of procedures other than those specified in this manual may result in exposure to hazardous radiation.

WARNUNG

Die Nichtbeachtung der in diesem Handbuch dargelegten Punkte sowie die Verwendung anderer Kontroll– oder Steuereinrichtungen kann dazu führen, daß gefährliche Strahlung abgegeben wird.

ATTENTION

L'utilisation de commandes et réglages ou l'exécution de procédures autres que celles spécifiées dans ce manuel peuvent entraîner une exposition à des radiations dangereuses.

AVVERTENZA

L'uso di comandi, regolazioni o procedure diverse da quelle specificate nel presente manuale può comportare l'esposizione a radiazioni pericolose.

PRECAUCION

El uso de controles, adjustes o procedimientos distintos a los indicados en este manual puede exponerle a radiaciones peligrosas.

Be aware of components in the printer that are potentially hazardous or easily damaged. For example, the fuser unit becomes very hot under normal operating conditions, and several components use high voltage.

Observe the following precautions to ensure personal safety and proper installation and operation of the printer.

- Read all instructions.
- Save these instructions for later reference and use.
- Follow all warnings and instructions printed in this manual and marked on the printer.
- Keep combustible materials away from the printer.

- Provide adequate ventilation.
- Never push objects of any kind through the cabinet slots. They may contact dangerous voltage points or other hazards. Injury to the operator, damage to the printer, or fire could result.
- Never spill liquid of any kind on or in the printer. Use only cleaning agents and methods indicated in this manual.
- Make sure nothing rests on the power cord. Do not locate the power cord where people will walk on it. Do not place the power cord under any carpet.
- Do not lean or place heavy objects on top of the printer.

For additional requirements, refer to Appendix A.

Check the Power Requirements

WARNING

Do not connect the printer to the power source until instructed to do so and until all shipping restraints have been removed.

WARNUNG

Den Drucker nur unter Anleitung an die Stromquelle anschließen, und erst dann, wenn alle Versandmaterialien entfernt worden sind.

ATTENTION

A moins d'en avoir recu l'ordre, ne pas brancher l'imprimante avant d'en avoir ôté tout le matériel d'emballage.

AVVERTENZA

Collegare la stampante alla sorgente di alimentazione solo quando previsto dalle istruzioni è dopo che il materiale protettivo di spedizione e stato completamente rimosso.

PRECAUCION

No conecte la impresora a la fuente de alimentación hasta que no se indique hacerlo y una vez retirados todos los materiales de embalaje.

The printer must be connected to an acceptable AC power source; otherwise, the printer will not operate properly and may be damaged. The rear side panel label identifies the correct power source for the printer: either 100 to 120 VAC, 60 Hz (90 to 132 VAC, 47 to 63 Hz, 14 Amp) or 220 to 240 VAC, 50 Hz (198 to 264 VAC, 47 to 63 Hz, 7 Amp).

The power source must be properly grounded. Since large power fluctuations can cause the printer to malfunction, it should be connected to a “noise–free” power source, not subject to surges or noise generated by motors, lighting, or air conditioning equipment on the same circuit. To allow for an adequate power cable run, the printer should be placed no more than eight feet (2.5 meters) from the power outlet.

Select a Site

When selecting the location for the printer, consider the following power requirements, interface requirements, and environmental factors:

- A proper power source must be available. (Complete power requirements are specified in the “Check Power Requirements” section on page 2–3.)
- The location must be within the maximum cable length specifications for the host computer interface.
- The temperature range should be +50°F (10°C) to +90°F (32°C), with no sudden changes in temperature or humidity. The printer should be positioned away from any air drafts from heating or air conditioning ducts.
- Insure that the room provides adequate ventilation. The minimum room volume is 1000 cubic feet and must provide, at a minimum, one fresh air exchange every two hours.
- The location should provide enough space for maintenance and replacement of consumables (toner, developer, paper, etc.). Refer to Figure 2–1.
- The printer should not be exposed to direct sunlight or hot lighting equipment. This may cause an abnormal temperature rise in the printer and adversely affect its operation. If necessary, shade or screen the printer from such exposure.
- Avoid exposing the printer to any corrosive gases or vapors.
- Avoid installing the printer in an area subject to heavy vibrations.

For additional environmental requirements, refer to the “Introduction” chapter and to Appendix A.

Figure 2–1 illustrates spatial site requirements for the printer. The actual printer dimensions are shown in Figure 2–1. When installing the printer at your site, allow an additional 6 inches clearance behind the printer for connection of interface and power cables.

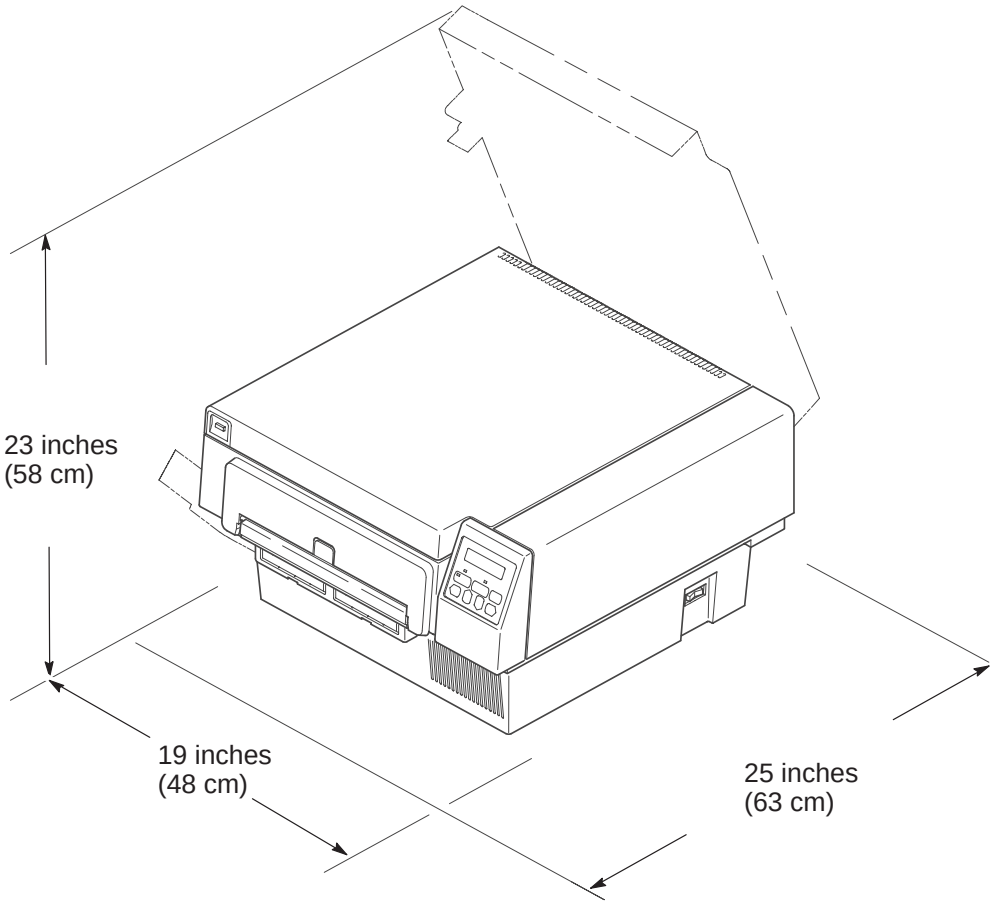

Figure 2–1. Clearance Requirements

Unpack the Printer

The printer is shipped in two cartons. The carton containing the consumables ship set is placed on top of the printer carton. The printer carton is shown in Figure 2–2 with all of the contents. The consumables ship set; which is made up of the toner kit, OPC cartridge, and developer kit, is shipped in its own carton (not shown in Figure 2–2), as shown in the figure below.

NOTE: Save the printer shipping materials in case they are needed to transport the printer to a new location.

NOTE: The material in the toner kit is recyclable. Save the toner box and packaging materials for recycling. A recycling shipping label, with instructions attached, is provided.

CAUTION

Keep the OPC unit in its protective bag whenever the unit is not housed in the printer.

Carefully open each carton and examine contents for indication of damage during transport. Use care when lifting the printer from the shipping carton.

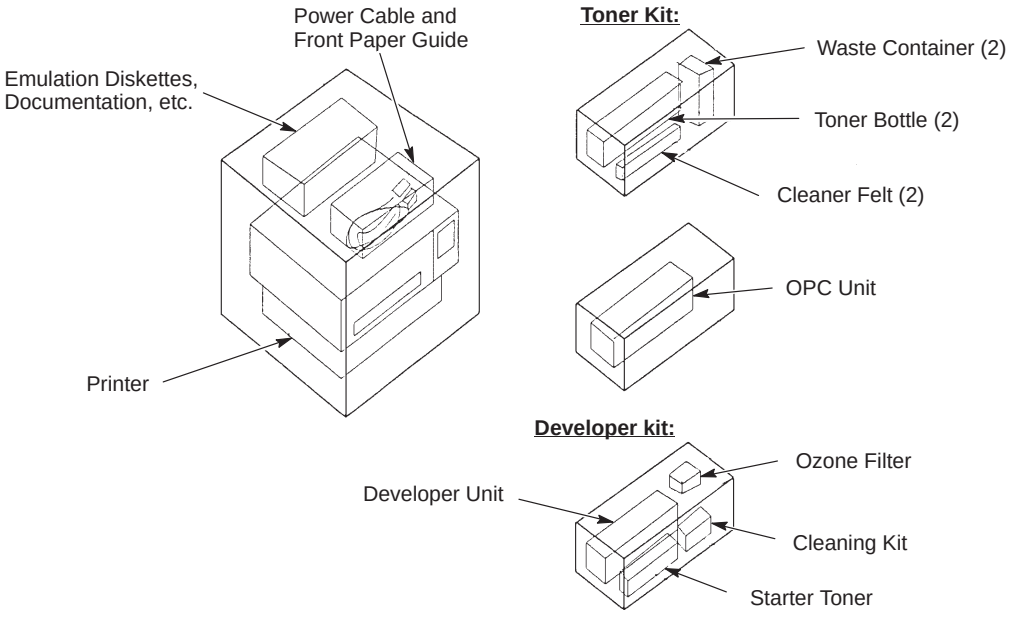

Figure 2–2. Unpacking the Printer

Initial Setup

To prepare the printer for operation, install the consumables that are packaged in consumable kits within the consumable ship set box. They are:

- Developer unit (Developer Kit)
- Starter Toner (Developer Kit)
- Ozone filter (Developer Kit)
- Waste toner container (Toner Kit)
- Fuser cleaner felt (Toner Kit)
- OPC drum unit

NOTE: The material in the toner kit is recyclable. Save the toner box and packaging materials for recycling. A recycling shipping label is provided with instructions attached.

To install the consumables, perform the following procedures in the order presented.

Install the Developer Unit

CAUTION

Do this procedure *only* if this is the initial installation and no toner has been added to the developing unit. Otherwise, fill the toner hopper with toner from the toner bottle.

1. Raise the top of the printer by firmly pressing the top cover latch on the left of the front panel. (See Figure 2–5.)
2. Remove the new developer unit from its foil package.
3. Slide the developer unit along the plastic rails on either side of the printer until the developer unit is in position.
4. Lock the developer unit in place by pushing the two green lock-down clamps down until they click.

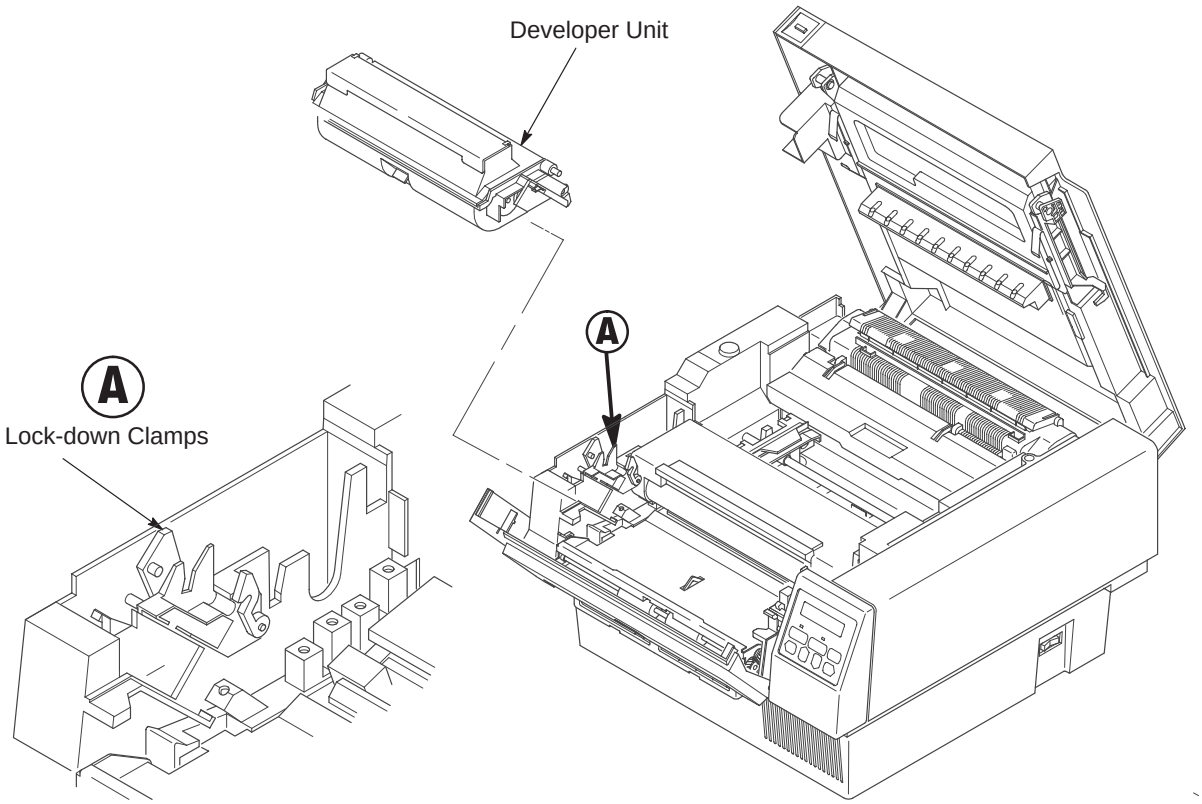

Figure 2–3. Installing the Developer Unit

Add the Starter Toner

Toner is light and easily becomes air-borne and can contaminate the printer. Be careful not to stain your hands, clothes, or the interior of the printer with toner.

NOTE: Use care when handling toner. If toner is spilled, use a toner vacuum to clean up the loose toner. Do not use water to clean the toner from the printer. Any toner remaining on clothes can be removed with a cloth dampened in cold water. Never use hot water to remove toner from clothes or skin.

When the toner is low, the printer will stop and the LCD will show “03 ADD TONER AND CHK WASTE BOTTLE.”

NOTE: Do not turn off the printer during a print job to add toner; otherwise, all unprinted data will be lost. Once the toner is added, press ON LINE to continue printing.

1. Open the starter toner bottle, from the developer kit, and attach the spout. (See Figure 2–4.)

2. Carefully open the developer unit cover.

3. Carefully pour the starter toner into the developer unit. Make sure to spread the toner evenly from side to side.

4. Close the developer unit cover. Press the cover until you hear a click which indicates that the developer unit is closed completely.

5. Clean up any toner that may have spilled during this process using one of the moist towels that come with the cleaning kit inside the developer kit.

NOTE: Some software stops communicating with the printer if the printer is off line for more than two minutes. In this case, you may need to restart your print job.

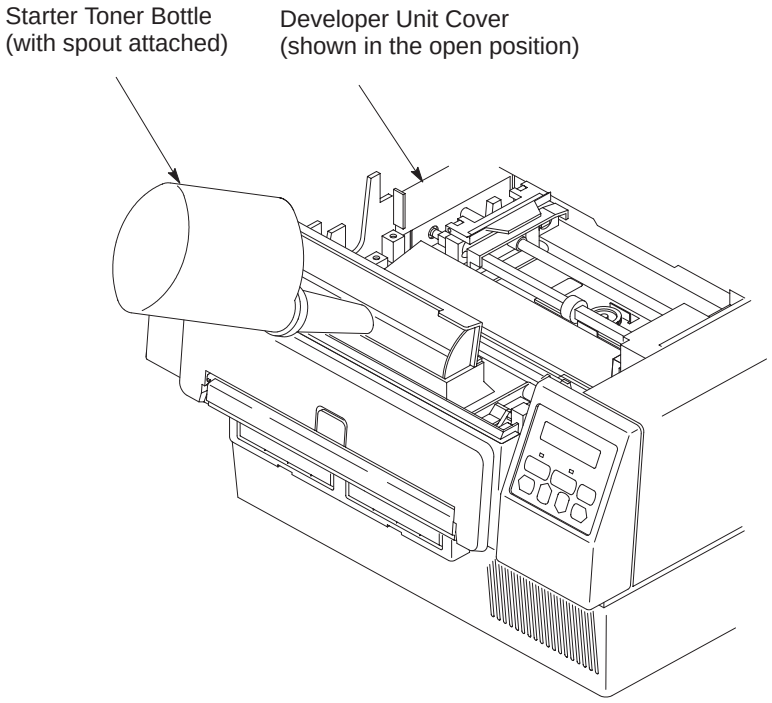

Figure 2–4. Filling the Toner Cartridge

IMPORTANT

For the initial installation, use the starter toner bottle from the developer kit. *Do not* use the toner bottles in the toner kit, which consists of two toner bottles, two fuser cleaner felts, and two waste toner containers.

The printer will run with starter toner for the first 200 pages, then you will need to add toner when the LOW TONER message appears.

Install the Ozone Filter

1. Remove the ozone filter from the plastic bag.
2. Holding the ozone filter by its tab, place the ozone filter into the slot on the inside of the front of the printer. (See Figure 2–5.)

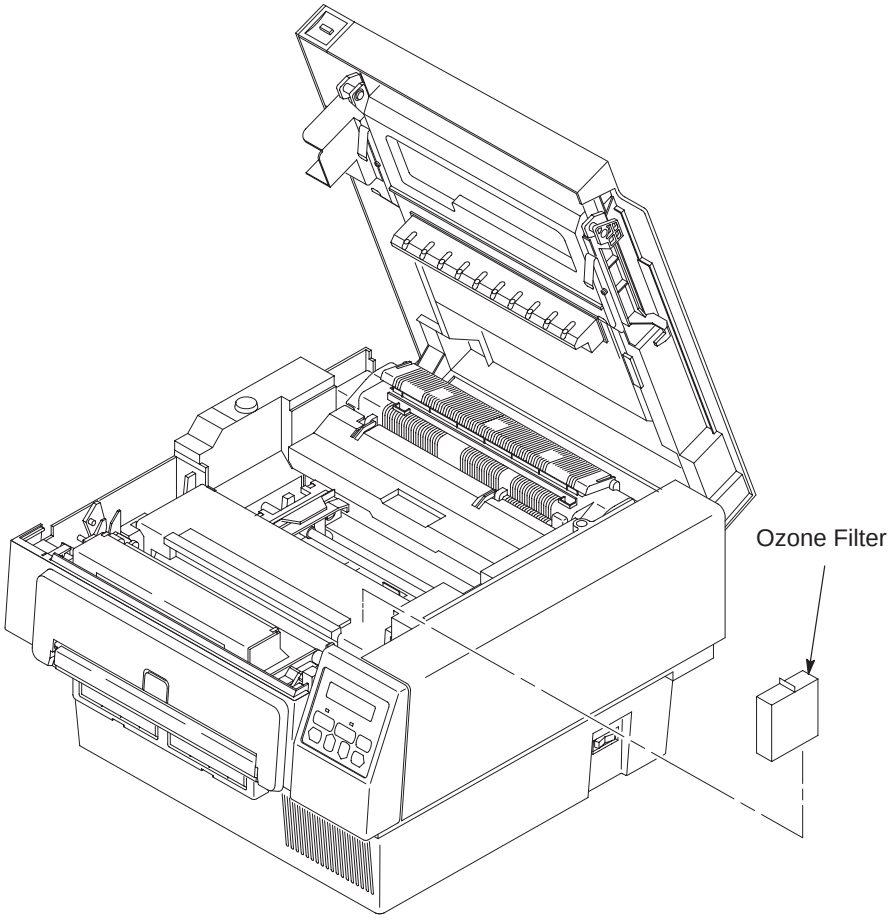

Figure 2–5. Installing the Ozone Filter

Install the Waste Toner Container

NOTE: The OPC drum unit must be removed before placing the waste toner container into its opening.

CAUTION

The OPC drum unit is light sensitive. Install it within five minutes. When removing the drum unit from the foil bag, *do not* touch the surface of the drum unit. Fingerprints and scratches can damage the drum surface and cause poor print quality. *Do not* rotate the drum unit manually. Forced rotation will cause an incorrect count for the life of the drum unit and may cause poor print quality.

1. If installed, remove the OPC unit by lifting it carefully out of the printer and place it on a flat surface.
2. Remove one of the waste toner containers from the toner kit box.

NOTE: If the green cap is placed on the filling hole, it cannot be removed, in which case the waste toner container should be discarded.

3. Make sure that the green cap is on the cap holder rather than on the filling hole of the new waste toner container.

NOTE: The waste toner container must be properly seated in the printer or the printer will display an error message when the printer cover is closed.

4. Install the waste toner container in the printer as shown in Figure 2–6.

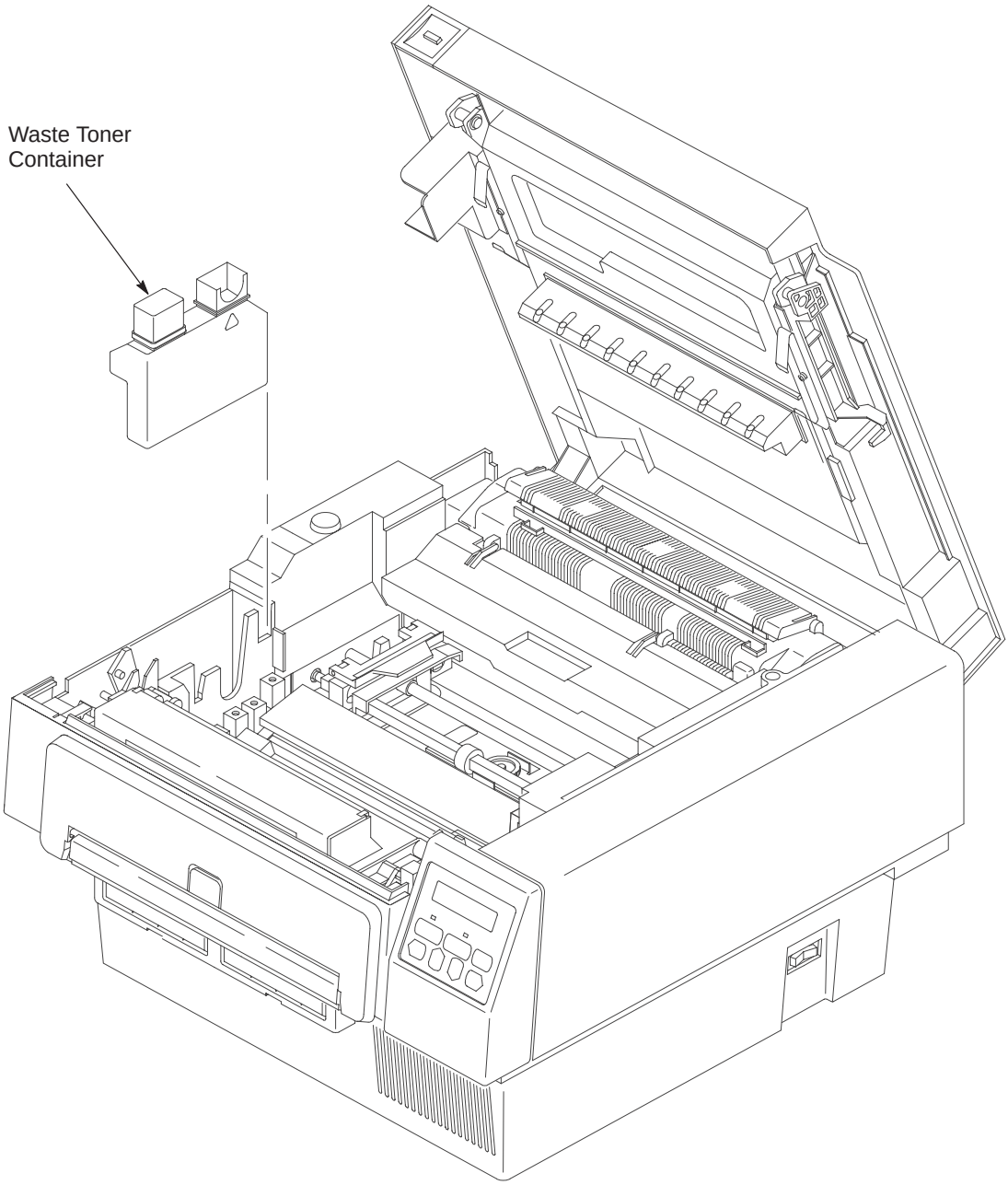

Figure 2–6. Installing the Waste Toner Cartridge

Install the Fuser Cleaner Felt

1. Remove one of the fuser cleaner felts from the toner kit box.
2. Remove the fuser cleaner felt from its plastic wrapping.
3. Lift the cleaner felt cover on the fuser unit. If the cleaner felt cover comes off, simply slide the shafts into the appropriate openings in the fuser unit. (See Figure 2–7.)
4. Carefully slide the fuser cleaner felt into the opening on the top of the fuser unit.
5. Close the cleaner felt cover.

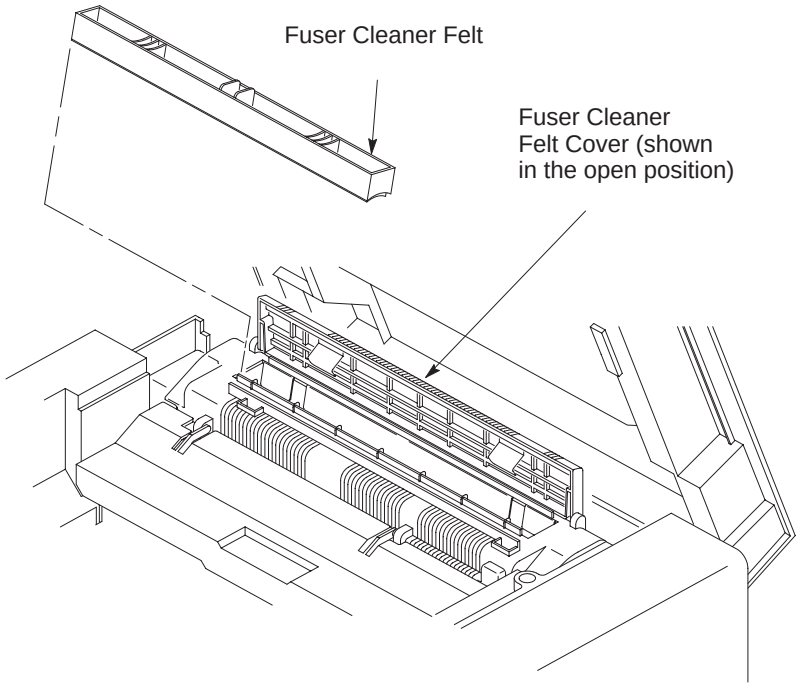

Figure 2–7. Installing the Fuser Cleaner Unit

Install the OPC Drum Unit

CAUTION

The OPC drum unit is light sensitive. Install it within five minutes. When removing the drum unit from the foil bag, *do not* touch the surface of the drum unit. Fingerprints and scratches can damage the drum surface and cause poor print quality. *Do not* rotate the drum unit manually. Forced rotation will cause an incorrect count for the life of the drum unit and may cause poor print quality.

1. Remove the OPC drum unit from its foil bag.

NOTE: Save the foil bag and insert the OPC drum unit into the bag whenever the printer cover is open for more than five minutes.

2. Insert the drum unit behind the developer unit. The OPC drum unit will slide into place easily. (See Figure 2–8.)

NOTE: The drum unit does not lock into place; it rests behind the developer unit.

3. Close the printer cover.

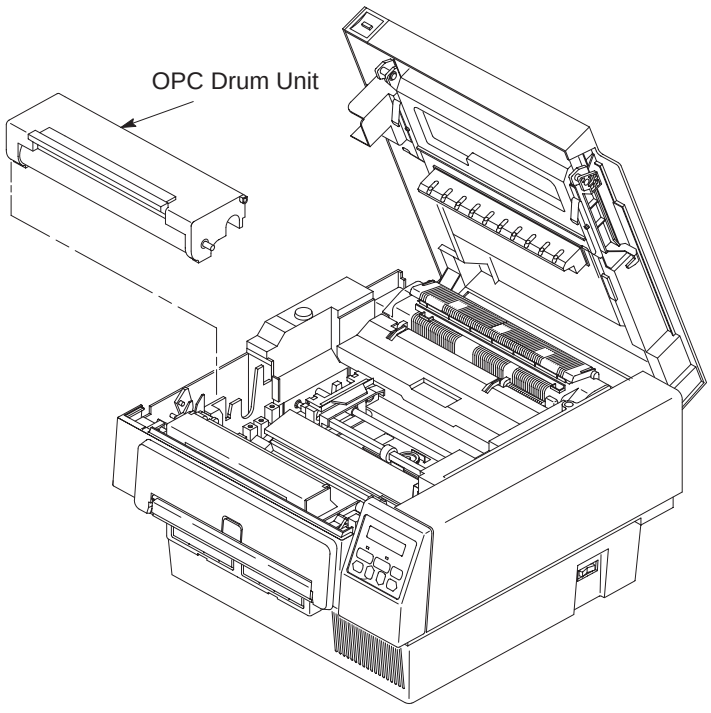

Figure 2–8. Installing the OPC Drum Unit

Load Paper

1. Install the paper entrance guide.
2. Install the paper exit guide.
3. Raise the top of the printer by firmly pressing the top cover latch on the left side of the front panel. (See Figure 2–11.)
4. Insert paper into the front of the printer. Press the tension release as required to insert the paper.
5. Unlock the tractors by pushing up the tractor locks.
6. Open the tractor gates on the tractor unit, place the paper on the pins, and close the tractor gates.
7. Adjust the width of the tractors so that the paper is tight.
8. Lock the tractor unit by pushing down on the tractor locks.
9. To ensure that the printer will start at the top of a page, check the following:
    a. The leading edge of the paper should be straight; not torn, crooked, or curled.
    b. The leading edge of the paper should not extend beyond the tractors. This allows the printer to set the top of form accurately and automatically at the leading edge of the paper.
10. Close the top cover of the printer.

NOTE: Repeat the paper loading procedure whenever top of form needs to be reset (e.g., after clearing a paper jam, loading new paper, etc.). For details on clearing paper jams, refer to the “Diagnostics and Troubleshooting” chapter.

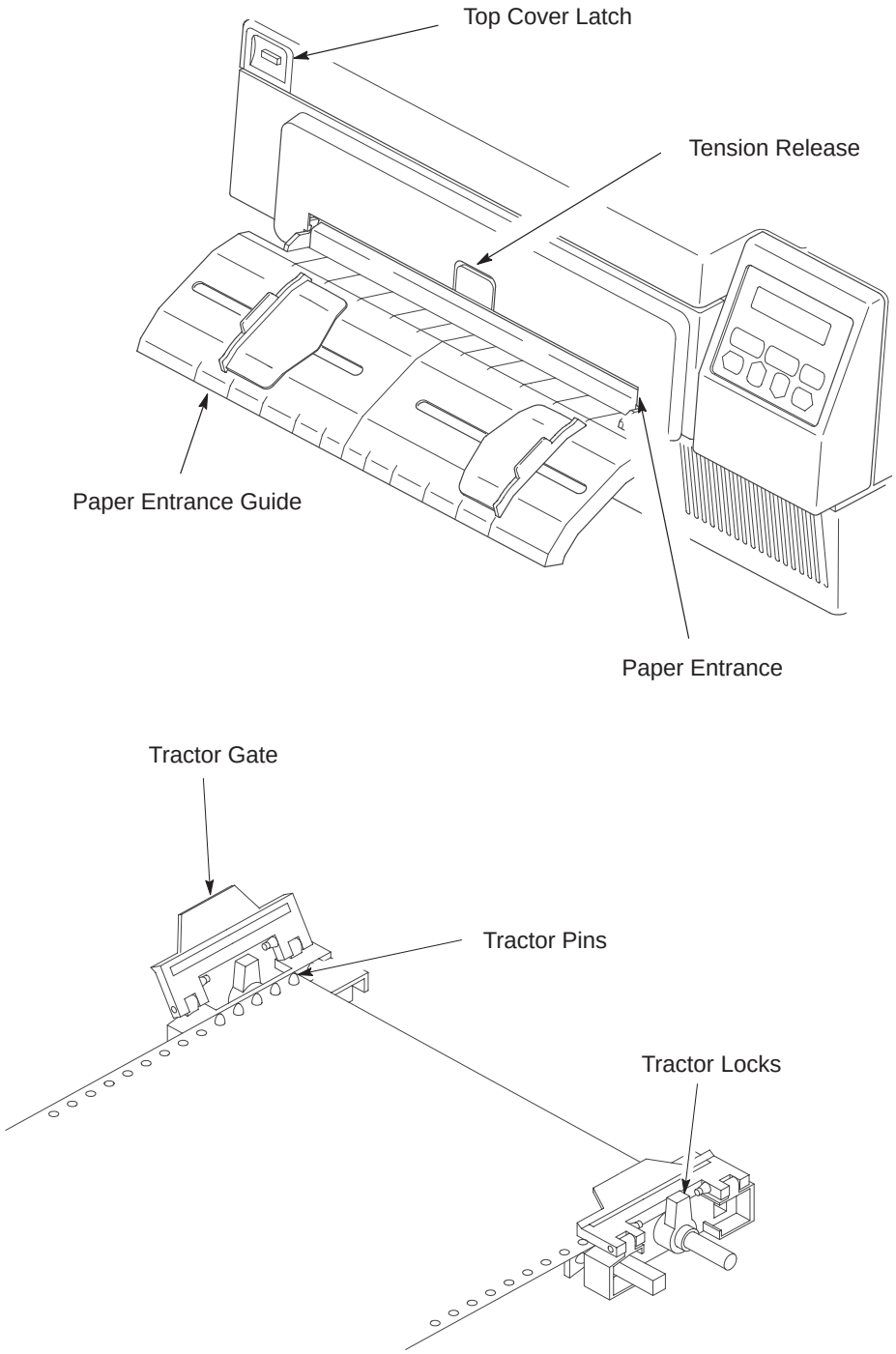

Figure 2–9. Loading Paper

Cable Connections

Connect the interface cable to the appropriate printer interface connector and to the host computer. (See Figure 2-12.) The printer supports a variety of standard and optional interfaces:

- Centronics parallel
- IEEE 1284 parallel
- Dataproducts parallel (requires optional cable adapter)
- RS–232 and RS–422 serial
- Coax/Twinax (option)
- PrintNet Ethernet LAN (option)

NOTE: RS–422 can be enabled or disabled via a menu option on the control panel under the Host Interface selection. Make sure this selection is properly made for your application.

NOTE: The printer must be properly configured for the appropriate interface. Refer to the “Configuring the Printer” chapter for more information.

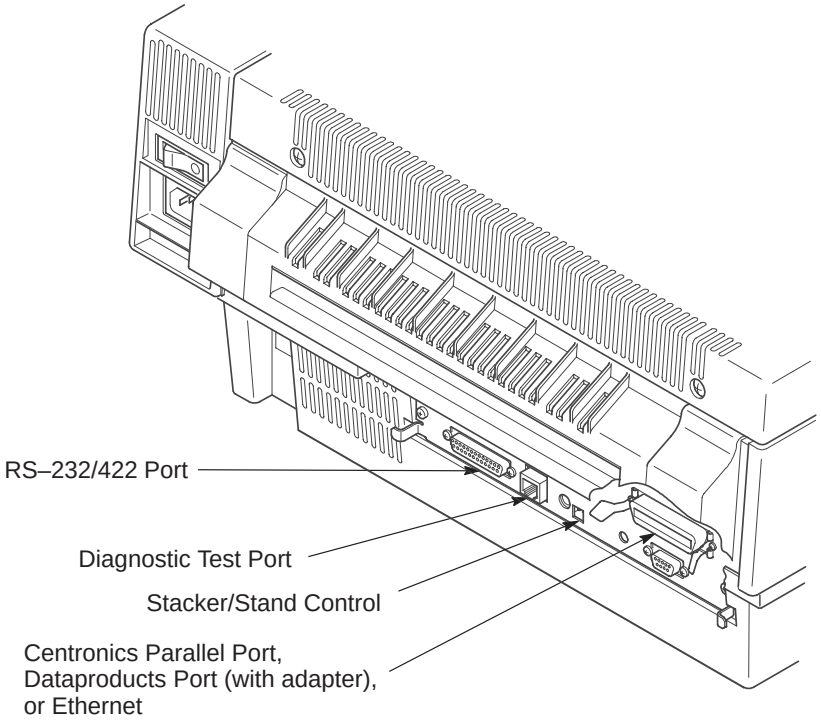

Figure 2–10. Cable Connections

Powering On The Printer

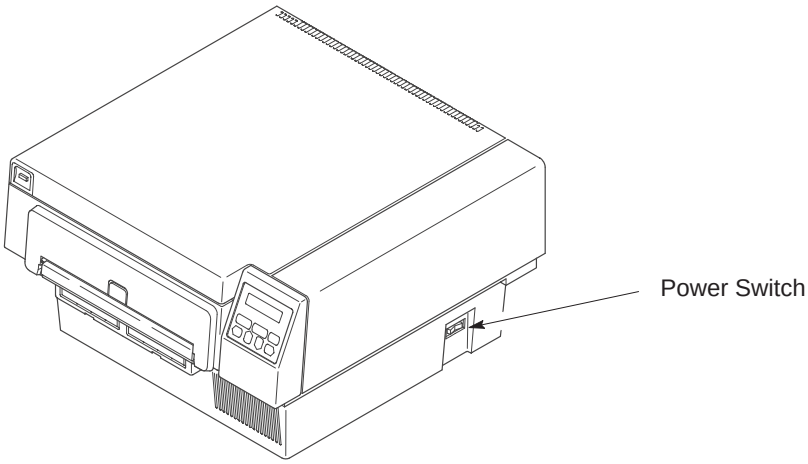

Figure 2–11. Power Switch

WARNING

To prevent injury to yourself or damage to the printer, make sure the printer is connected to a proper power source.

WARNUNG

Um Personenschäden oder eine Beschädigung des Druckers zu verhindern, sicherstellen, daß der Drucker an eine geeignete Stromquelle angeschlossen ist.

ATTENTION

S’assurer que l’imprimante est branchée afin d’éviter tout risque de blessures corporelles ou de dommages à l’imprimante.

AVVERTENZA

Prevenire danni la ferita a lei o to la stampante, assicurasi che stampante è collegata ad una fonte di energia adeguata.

PRECAUCION

Prevenir lesión a se o daño a la impresora , cerciórese de que la impresora esté conectada con una fuente de energia apropiada.

1. Make sure the power switch is set to 0 (OFF).
2. Verify that the site line voltage is the same as the voltage specified in “Check the Power Requirements” section, page 2–3.
3. Connect the power cord (supplied with the printer) to the AC power connector on the printer. (See Figure 2–12.)

NOTE: To prevent electrical interference, separate the AC power cord and the interface cable.

4. Connect the opposite end of the power cord to the AC line receptacle.
5. Turn on the printer by setting the power switch to | (on). (See Figure 2–13.)
6. When you power on the printer, the following occurs:

    c. The printer reads the emulation and displays the message: “Testing Hardware Please Wait...” All three indicators are lit continuously.

    d. If there are no bootup errors, the LCD displays “Diagnostics Passed.” All three indicators go out.

    e. “Standby...” and “Loading Fonts” appear briefly on the LCD.

    f. The ONLINE indicator lights continuously, and the LCD displays “ONLINE.”

NOTE: The printer can be set to power on in the OFFLINE state instead of the ONLINE state. To print, ONLINE must be lit; if it is not, press ONLINE.

If other messages and prompts appear on the control panel, answer the prompts and follow the directions as explained in Table 3-1 , “Flash Messages” on page 3–60.

Check for Interference

The printer should be used only with FCC, VDE, or CE certified computing devices. If the printer is installed within 10 feet of audio or video equipment, interference may occur. Determine if there is interference by turning the printer ON and OFF and checking the audio and video equipment for noise spikes. If interference occurs, perform the following:

1. Relocate the printer or the electronic device affected by the interference, including the antenna, if applicable.
2. Ensure that the printer and electronic device are on separate power circuits or install AC line filters.
3. Ensure that the wall outlets are properly grounded.

If these steps do not resolve the problem, refer to the Federal Communications Commission Booklet, “How to Identify and Resolve Radio – TV Interference Problems” (stock number: 004–000–00345–4), available through the U.S. Government Printing Office, Washington, D.C. 20402.

Transporting the Printer

Take precautions to prevent damage to the printer during transport. If a move requires trucking, use the original packaging materials.

Short Distance Transport

1. Turn off the printer and unplug the power cord from the wall outlet.
2. Remove the paper.
3. Remove all external communication and interconnection cables (AC line cord, coax cable, any optional attachment cards, etc.) from the printer.
4. Before you remove the developer unit, place several sheets of paper in front of the printer and on a work surface that you will set the developer on. Do this in case any toner spills.
5. Remove the developer unit. (It is a good idea to have a toner vacuum handy when performing this step.)
6. Place the developer unit in a sealable plastic bag.

7. Temporarily remove the OPC drum in order to remove the waste toner container.

NOTE: The waste toner container is recyclable. A recycling shipping label is provided, with instructions attached, in the toner box.

8. Place the green cap on the filler hole of the waste toner container and remove it from the printer and package it for recycling.

9. Install the OPC Drum in the printer.

10. Always carry the printer and developer unit upright.

Long Distance Transport

1. Pack all connecting cables in a plastic bag.

2. Put the developer unit in appropriate packaging for recycling.

3. Put the OPC drum unit in appropriate packaging for recycling.

4. Using a towel and a toner vacuum, remove residual toner from inside the printer.

CAUTION

Failure to secure the fuser pressure roller for shipment can cause permanent damage to the printer.

The fuser must be cool before proceeding further.

5. Secure the fuser pressure roller (lower roller) to prevent it from bouncing during shipment. Insert the original foam pad between the fuser rollers.

NOTE: If the original foam pad is not available for use, use bubble wrap or other foam packing material to secure the lower fuser roller.

NOTE: Replacement packaging material can be procured from your authorized representative.

6. Use original packing material if available. Otherwise, use sufficient shock-absorbing packaging material.

7. Secure the top and front covers to keep them from opening.

8. At the new site, install a new developer unit and waste toner container.

3 Configuring the Printer

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Changing Printer Settings

Changing printer settings, such as paper length, emulation, and host I/O interface, is referred to as configuring the printer. You configure the printer using the control panel.

1. Make sure the printer is offline. If ONLINE is lit, press ON LINE.

   ```
   OFFLINE
   CONFIG CONTROL
   ```

2. Press NEXT or PREV to cycle through these menus:

   Config. Control

   Active Emulation

   Mode

   Host Interface

   Paper Control

   Printer Control

   Maintenance/Miscellaneous

   Font Memory

   Diagnostics

3. When the desired menu is displayed, press DOWN to access the available options or submenus for that menu.

4. Press NEXT or PREV to scroll through the values.

5. Press ENTER to select a value. An asterisk is displayed next to the selected value.

NOTE: The ENTER switch must be *unlocked* to change printer settings. The default at power-up is the “LOCKED” state. If the ENTER switch has been locked, you must unlock it before the printer will accept the new parameter setting. Press UP and DOWN simultaneously to toggle between lock and unlock. The ENTER key lock combination can be configured to be a key combination other than UP and DOWN. When ENTER is unlocked, the display will momentarily flash:

ENTER SWITCH
UNLOCKED

6. If there are more values you want to change, use the UP, DOWN, NEXT and PREV switches to access the value and press ENTER to select it.
7. At any time, you may press UP to return to the options one level higher.
8. At any time, you may also press ON LINE to save your changes temporarily, exit the configuration menu, and place the printer *online*.
9. Once you have finished selecting all of your options, you can save your configuration for later access. Save the configuration as described on page 3–12 if desired.

IMPORTANT

If you do not save your configuration, all of the new values are lost when you turn off the printer. (Refer to "Config Control" on page 3–12.)

Saving a Configuration

You can save up to eight different configurations to meet unique print job requirements.

For example:

Config. 0:	Factory Default (This cannot be altered. See page 3–12 .)
Config. 1:	Selects RS–232 Serial Interface Selects Image Width of 4 inches Selects Paper Length of 24 inches Selects Image Shift of 1 inch, etc.
Config. 2:	Selects Dataproducts Parallel Interface Selects Image Width of 8 inches Selects Paper Length of 11 inches Selects Image Shift of 3/20 inch, etc.

The configurations are saved and stored in flash memory for later use. These configurations, including the factory default, will not be affected when the printer power is turned off. If you do not save your configuration before you turn off the printer, the current configuration is lost.

NOTE: If the “Protect Configs.” option is enabled, the new configuration will not be saved unless the existing configuration has been deleted. Refer to page 3–19 for details.

Follow these steps to save a new configuration:

1. Press ON LINE to take the printer offline.

   ```
   OFFLINE
   CONFIG. CONTROL
   ```

2. Press DOWN.

3. Press NEXT or PREV until the following is displayed:

   ```
   CONFIG. CONTROL
   Save Config.
   ```

4. Press DOWN.

5. Press NEXT or PREV to cycle through the options (1–8).

NOTE: Configuration “0” does not appear in this list. It is the default configuration and can not be altered.

NOTE: If the “Protect Configs.” option is not enabled, the number configuration selected will be erased in order to write the current configuration. Make sure the number selected is empty or no longer required before making this selection.

6. When the desired number is displayed, press ENTER to select it.

   If the configuration number has been previously saved *and* the “Protect Configs.” option is enabled, the following error message is displayed briefly:

   ```
   CFG FILE EXISTS
   DELETE FIRST
   ```

   If the configuration number has not been previously saved *or* the “Protect Configs.” option is disabled, the following is displayed briefly:

```
Saving Configuration
```

The following is displayed to indicate the configuration has been saved:

```
Save Config.
(selected number) *
```

7. It is recommended you print the configuration and store it in a safe place for future reference. Refer to page 3–11 for details on printing the configuration.

NOTE: If you want to make these new configuration parameters active at printer power-up, make sure you select this configuration as the “power-up config” (page 3–19).

Modifying a Configuration

You can change a saved configuration by “writing” over it. For example, you can modify Config. 1, shown below. Suppose you want to keep all settings except the interface type (e.g., you want to change RS–232 to Centronics). It is necessary to load a configuration, make the desired changes, delete the current “copy” of the configuration, and save the current machine configuration (in this example, configuration 1 with the desired changes) as the newly modified configuration.

Config. 1: Selects RS–232 Serial Interface
Selects Image Width of 4 inches
Selects Paper Length of 24 inches
Selects Image Shift of 1 inch, etc.

1. Load the configuration to be changed (for example, Config. 1).

   a. Press ON LINE to take the printer offline.

```
OFFLINE
CONFIG. CONTROL
```

   b. Press DOWN.

```
CONFIG CONTROL
Load Config.
```

c. Press DOWN.

```
Load Config.
Factory*
```

d. Press NEXT or PREV to cycle through the options (0–8).

NOTE: Configuration “0” is the factory default configuration and cannot be altered. “0” is not displayed. The display shows “Factory, 1–8.”

e. When the desired number is displayed, press ENTER to make the selection. The following is displayed briefly:

```
Loading Saved
Configuration
```

The following is displayed to indicate the configuration has been loaded:

```
Load Config.
(selected number) *
```

If the configuration you have selected for loading has not been previously saved, the following error message is displayed briefly:

```
CONFIG. DOES NOT
EXIST/ Save First
```

2. Move through the menu and change all the desired values. (In this example, you would change the interface type value from Serial to Centronics.)
3. Press ENTER to save each new value. An asterisk is displayed next to the selected value.
4. Before saving the modified configuration, you must delete the original.

a. Press ON LINE twice to take the printer offline.

```
OFFLINE
CONFIG. CONTROL
```

b. Press DOWN.

```
CONFIG. CONTROL
Load Config.
```

c. Press DOWN.

d. Press NEXT or PREV until the following is displayed:

```
CONFIG. CONTROL
Delete Config.
```

e. Press DOWN.

f. Press NEXT or PREV to cycle through the options (1–8). When the desired number is displayed (e.g., 1), press ENTER to select it. The following is displayed briefly:

```
Deleting Configuration
```

Then, the following is displayed to indicate the configuration has been deleted:

```
Delete Config.
1 *
```

5. Save the new configuration as described on page 3–6. Make sure you select the same number (e.g., Config. 1) when saving the modified configuration. The new configuration replaces the existing one.

6. Print a copy of this newest configuration and store it in a safe place. Refer to page 3–11 for details.

NOTE: If you want to make these new configuration parameters active at printer power-up, make sure you select this configuration as the “power-up config” (page 3–23).

Printing a Configuration

It is recommended that you print and store your configurations for future reference. The printout provides a list of the parameters you set when you created this configuration.

To print a configuration:

1. Press ON LINE to take the printer offline.

   ```
   OFFLINE
   CONFIG. CONTROL
   ```

2. Press DOWN.

   ```
   CONFIG CONTROL
   Load Config.
   ```

3. Press NEXT or PREV until the following is displayed:

   ```
   CONFIG CONTROL
   Print Config.
   ```

4. Press DOWN.

5. Press NEXT or PREV to cycle through the following printout options:

   Current
   Factory (this is 0)
   Power–up
   All
   1–8 customized configurations

6. When the desired option is displayed, press ENTER. The printer prints the specified configuration.

Factory Settings

Table 3–1 lists the the factory default settings (i.e., Config. 0). These values are available for loading at any time, and are maintained in the printer until a new configuration is loaded.

Table 3–1. Factory Settings

Mode	LP+
LinePrinter+	(Refer to the *LP+ User's Manual* for defaults.)
PCL5 (optional)	
IGP/PGL (optional)	
IGP/VGL (optional)	
IPDS (optional)	
CTHI (optional)	
Host Interface	
Centronics	
Data Bit 8	Enable
PI Ignored	Enable
Data Polarity	Standard
Resp. Polarity	Standard
Busy On Strobe	Enable
Latch Data On	Leading
Prime Signal	Enable
TOF Action	Reset
Buffer Size In K	64
Dataproducts	
Data Bit 8	Enable
P I Ignored	Enable
Data Polarity	Standard
Resp. Polarity	Standard
Latch Data On	Middle
Prime Signal	Disable
TOF Action	Reset
Buffer Size In K	64

Serial	
Interface Type	RS–232
Data Protocol	XON/XOFF
Baud Rate	9600 baud
Word Length	8
Stop Bits	1
Parity	None
Data Term Ready	True
Request To Send	On/Offline and Buffer
Buffer Size In K	64
Poll Character	00 Hex
Poll Response	0 MS
Idle Response	Disable
One Char Enquiry	Disable
IEEE 1284	
Prime Signal	Enable
TOF Action	Reset
Buffer Size In K	64
Ethernet	
Buffer Size In K	64
Ethernet Params	Only if NIC is installed
IP Address	xxx.xxx.xxx.xxx
Gateway Address	xxx.xxx.xxx.xxx
Subnet Mask	xxx.xxx.xxx.xxx
MAC Address	hh.hh.hh.hh.hh.hh
Novell Protocol	Enable
NetBIOS Protocol	Enable
Novell Frame	Auto Sensing
PPM Port Number	3001
PPM Port Timeout	100 secs.
Auto Switching	
Parallel Hotport	
Port Type	Centronics
Trickle Time	1/4 sec.
Time Out	10 sec.
Report Status	Disable
Serial Hotport	
Port Type	RS–232
Trickle Time	1/4 sec.
Time Out	10 sec.
Report Status	Disable

C/T Hotport	
Port Type	Twinax
Timeout	10 sec.
Report Status	Disable
Paper Control	
Image Width	8.0 inches (8.5 inches for PCL5 only)
Paper Length	11.0 inches
Hor Image Shift	3/20 inches
Vert Image Shift	0/100 inches
Reprint on Fault	Enabled
Printer Control	
Fuser Temperature	Normal
Energy Time Out	5 minute
No Retract Mode	Disable
Ignore Errors	
Check TOF Lever	Disable
Paper Control Error	Enable
Maint / Misc	
Panel Key Sound	On
Alarm	On
Power–up State	Online
Hex Dump Mode	Disable
PTX SETUP Option	
SETUP PARSE	Disable
SETUP SFCC	21h
Display Language	English
Downloaded Fonts	
File System	
Auto Locking	
Set Lock Key	
Font Memory	
Max Cache Memory	900 KBytes
Max Cached Characters	01 KBytes
Standard Characters	340
Bold Characters	448
Extra Bold Characters	504

Configuration Menus

The printer provides the following “main level” configuration menus:

- **Config. Control**. These options allow you to save, print, load, delete, name, and reset entire sets of configuration parameters.
- **Active Emulation**. This menu allows you to select the PGL or VGL emulation from the menu if IGP, PCL5, or LP+ is installed.
- **Mode**. This menu allows you to configure the options which are available for the current operating (active) emulation. For example, if LinePrinter+ is the active emulation, options can be configured using this menu.
- **Host Interface**. These options allow you to select either the Serial RS–232, Serial RS–422, Centronics® parallel, Dataproducts® parallel, Ethernet™, IEEE® 1284 parallel, Auto Switching, Coax, or Twinax interface for the printer (which must match the interface cabling you installed while setting up your printer, described in Chapter 2). This menu also allows you to configure several parameters for each interface.
- **Ethernet Params**. This option allows you to view and change the IP Address, Gateway Address, and Subnet Mask. The Mac Address may also be viewed.
- **Paper Control**. These options allow you to select page length and width.
- **Printer Control**. These options allow you to select several operating parameters for the printer, such as the speed at which paper will advance when slewing.
- **Maintenance/Miscellaneous**. these options provide miscellaneous functions such as printing a hex dump, selecting a display language, setting the key lock, and choosing whether the printer will power up in off line or on line mode.
- **Font Memory**. This option allows you to store different kinds of fonts in various amounts.
- **Diagnostics**. These options include the diagnostic tests, system memory, and the statistics of the printer.

The following pages show the configuration menus and describe the options.

Configuration Menu Overview

The configuration process matches the printer operating characteristics to those of the host computer.

This chapter explains how to use the control panel to change individual settings and save them as a customized configuration.

Figure 3–1 shows an overview of the configuration menu. The following pages describe how to move within the menu, change configuration settings, and save and print configurations. This is the menu structure for the LinePrinter Plus emulation. (Menu options are explained beginning on page 3–17.)

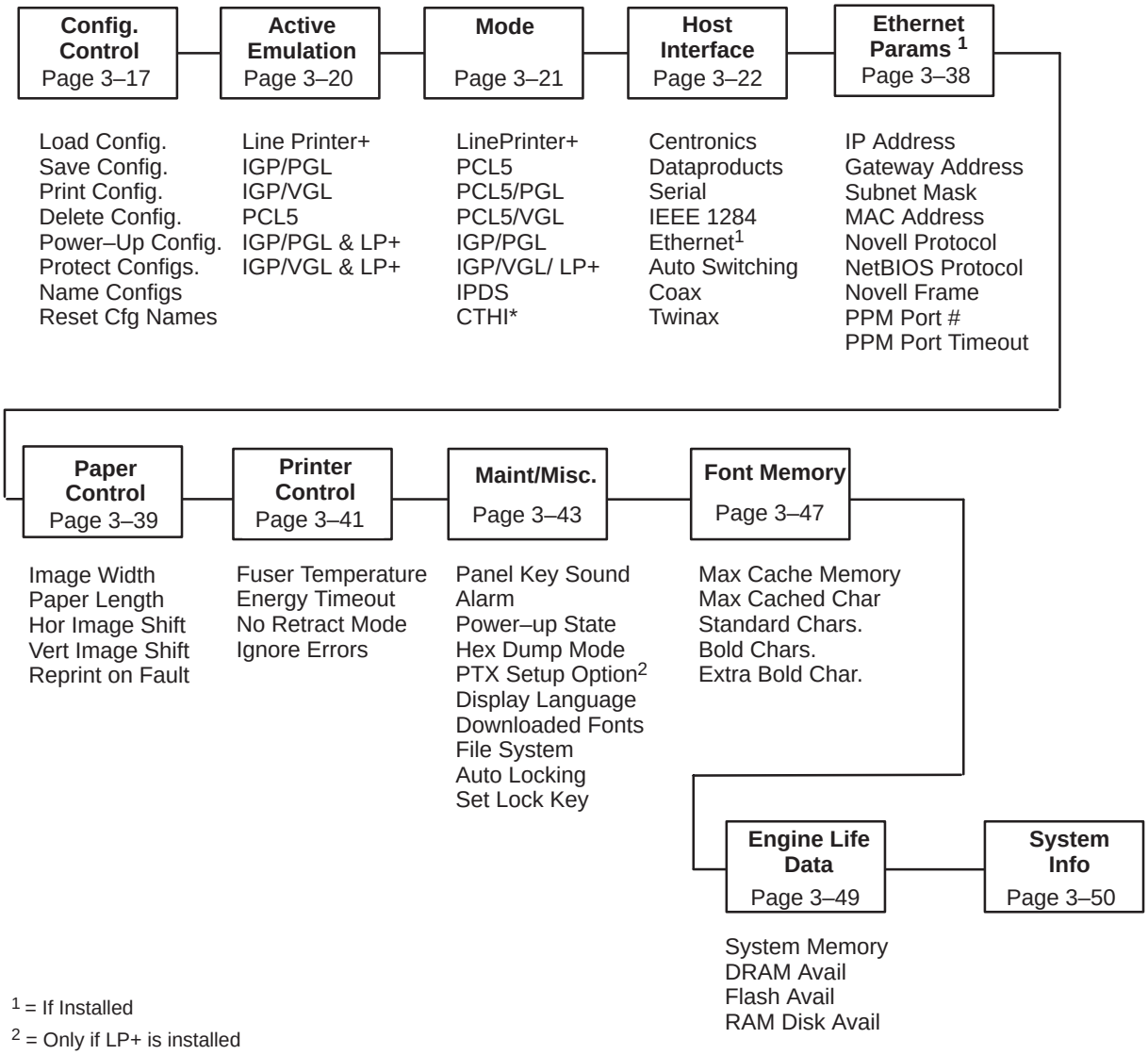


Figure 3–1. The Configuration Menu

Config Control Menu

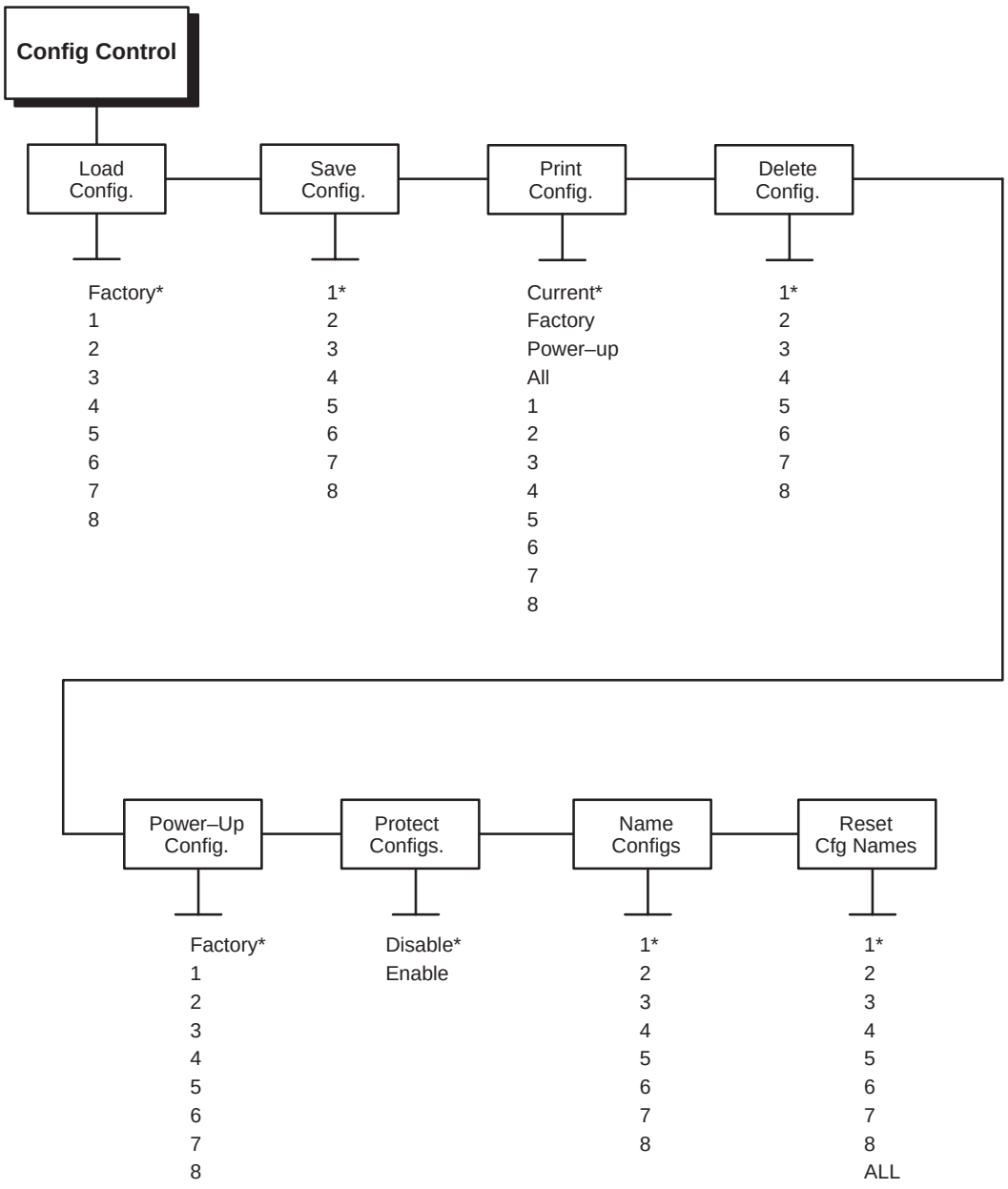


Figure 3–2. Config. Control Menu

Load Configuration

The printer can store numerous configurations. This option allows you to select and load a specific configuration.

The factory default for loading is configuration 0. Note that configuration 0 is a factory-preset configuration that cannot be changed and is always available for loading.

Save Configuration

Save configuration allows you to save up to eight different configurations to meet different print job requirements.

Configuration 0 is a factory-preset configuration that cannot be changed or saved.

NOTE: If the “Protect Save CFG” option is enabled, the new configuration is not saved unless the existing configuration has been deleted.

Print Configuration

Print configuration allows you to output a listing of various stored printer configuration parameters. You can print the following configurations:

- Current
- Factory
- Power–up
- All
- Any of the customized configurations (1 through 8)

For details on making a configuration printout see page 3–12.

NOTE: The information (Engine Page, System Memory, etc.) that is displayed on the LCD via the System Info menu is printed only as part of the printout for the Current configuration. Thus, if you want to make a printout that includes system information, you must select either the “Current” configuration or “All” configurations from the Print Configuration menu.

Delete Configuration

Delete configuration allows you to delete a configuration file. You can delete one or all of your eight customized configurations.

Configuration 0 is a factory-preset configuration and cannot be changed or deleted.

Power-Up Configuration

Power-up configuration allows you to specify one of nine (0–8) configurations to be used upon printer power-up. The factory default for power-up is configuration 0.

Protect Configs

The Protect Configs (protect saved configuration) option allows you to specify whether or not a new configuration should “overwrite” an existing configuration when you activate the “Save Config” option:

- When disabled (default), the new configuration overwrites the existing configuration. There is no protection set for the former configuration.
- When enabled, the new configuration does not overwrite the existing configuration, and the following is displayed:

  ```
  CONFIG. EXISTS
  DELETE FIRST
  ```

  Therefore, you must delete an existing configuration before trying to save a new configuration, as it is protected.

Name Configs

You may specify a 15 character name which can be used to identify a configuration. The name you enter for a configuration will be used in the Load Config., Save Config., Delete Config., and Power-Up Config. menus. The names can only be cleared by using the Reset Cfg Names Menu.

When you move into the Name Configs. menu, the top line of the display shows the current configuration name. The second line of the display is initially the same as the top line. You can modify the second line of the display without affecting the top line until the ENTER key is pressed, which sets the modified name.

Press the UP or DOWN keys (▲or▼) to cycle through the values available for that character at the cursor location. Press the NEXT key to move to the next character to be modified. Press the PREV key to go back to a character you have already modified. Continue until you have entered the name you want to give to this configuration, then press ENTER to save. The name you entered will now represent this configuration on the printer's front panel. To exit this menu without saving, press any key other than the ENTER key. The configuration name will revert to the last saved value.

Reset Cfg Names

You can reset specific configuration names back to the default value of the configuration number.

Active Emulation Menu

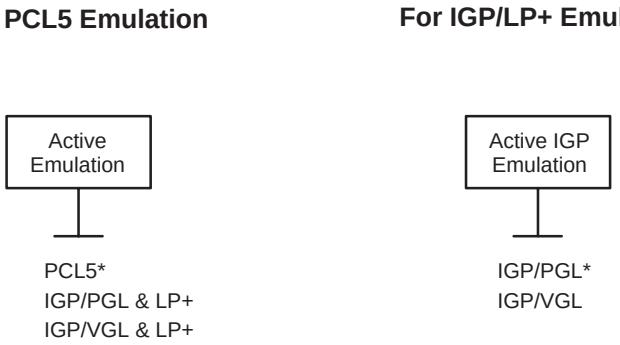


Figure 3–3. Active Emulation Menu

This ACTIVE EMULATION function allows the user to activate an emulation. There are two ways to select the desired emulation: by selecting the emulation directly from the printer menu or by sending a host command which change the emulation automatically (see the appropriate *Programmer's Reference Manual* for details).

The printer can contain more than one emulation at a time. These emulations are mutually exclusive and only one can be active at a time. The menu above selects the emulation to be active. The entries in this menu depend upon the options installed in the printer.

When changing from one emulation to another, the printer will load the power–up configuration. Thus, any configuration settings done before selecting these emulations and not saved in NVRAM will be lost.

NOTE: In order to configure an emulation, that emulation must be selected in the ACTIVE EMULATION menu; other emulations not selected will not appear in the menu.

Mode Menu

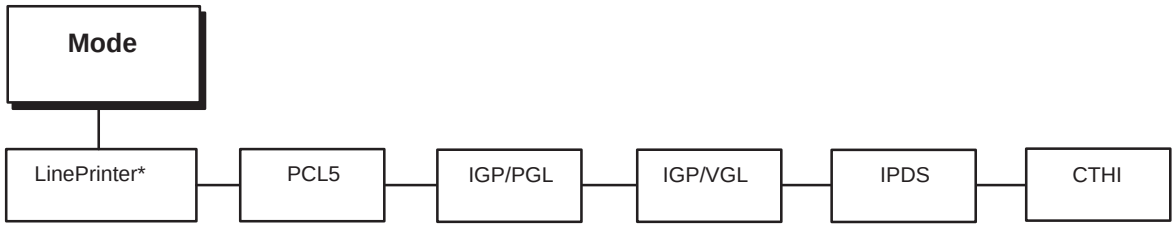


Figure 3–4. Mode Menu

“Mode” refers to the emulation software that you use. Your printer comes equipped with the Printronix LinePrinter Plus emulation software (which emulates an impact printer). The IGP/PGL, IGP/ VGL, IPDS, CTHI, and PhoenixPage PCL5 software emulations are available as options.

When you turn on the printer, it reads the Flash memory as part of its initialization, to determine what emulations are installed. Based on this information, the printer then creates the appropriate selections on the Mode menu. During power-up, the printer also loads the power-up set of configuration values. The power-up set is the same as the factory set until you select a new set for the power-up configuration.

NOTE: Each emulation can have its own set of configuration options in addition to those that are in the printer system list. For information on these unique configuration settings, see the appropriate emulation manual.

See also the following documents:

LinePrinter Plus Programmer’s Reference Manual

PhoenixPage PCL5 Emulation Operator’s Guide

IGP/PGL Emulation for LaserLine Printers Programmer's Reference Manual

IGP/VGL Emulation for LaserLine Printers Programmer's Reference Manual

IPDS Emulation for LaserLine Printers Programmer's Reference Manual

CTHI Emulation for LaserLine Printers Programmer's Reference Manual

Host Interface Menu

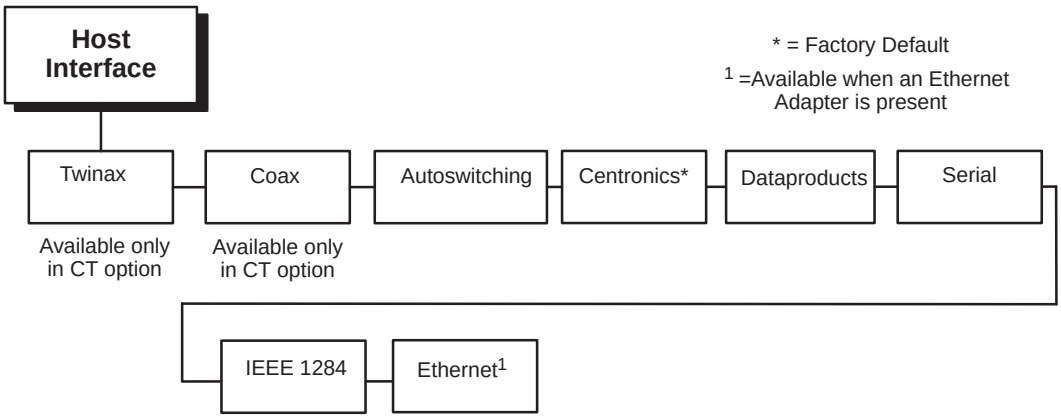


Figure 3–5. Host Interface Menu

The Host Interface Menu enables you to select and configure one of many types of interfaces between the printer and your host computer. The currently selected interface is indicated with an asterisk on the control panel message display. Each interface has its own submenu with a set of interface parameters which can be configured.

IMPORTANT

When switching between Twinax, Coax, or Auto Switching, the printer will load the power–up configuration and the new interface parameters. Any settings made and not saved before selecting these interfaces are lost.

Host Interface: Autoswitching

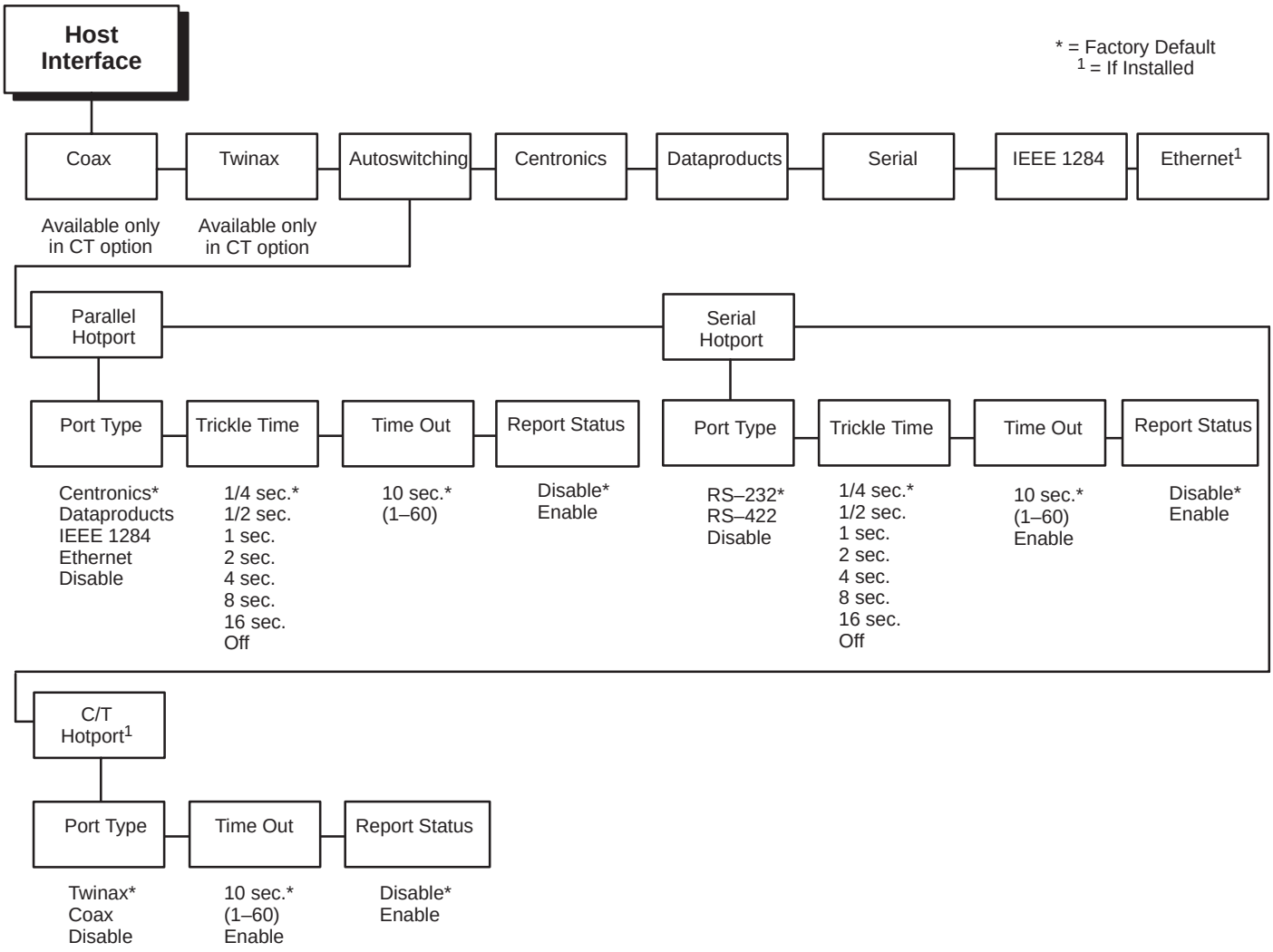


Figure 3–6. Host Interface: Autoswitching

Auto Switching

Autoswitching gives the printer the ability to handle multiple data streams simultaneously. With Auto Switching, the printer can service hosts attached to the serial, parallel, and C/T ports as if they were the only interface connected.For example, if the host computer sends one print job to the RS–232 serial port and a separate job to the IEEE 1284 parallel port, the printer's Auto Switching is able to handle both jobs, in the order they were received, without the user having to reconfigure the selected interface between jobs. The hotports are Parallel, Serial, and C/T .

Port Type

Select the types of parallel, serial, and C/T interfaces which are connected to the printer. For example, if your printer is attached to one host with a Centronics connection and a second host with an RS–422 connection, you would select Centronics under the Parallel Hotport menu, and RS–422 under the Serial Hotport menu.

Trickle Time

When the printer is printing data from a host and a second job is received by the printer from a different host, Trickle Time prevents the second host from timing out while it is waiting for its data to be printed. In order to support this feature, the port has to be able to accept data from the host and store it for future use.

For example, if the printer is printing a job from the serial port, and then receives a second print job from the parallel port, the data from the parallel port will “trickle” bit by bit into the printer buffer to prevent a timeout error from being sent back to the host connected to the parallel port.

The selected value is the time that the printer waits before getting the next byte of data from the host. The Trickle Time value should be less than the host time out value, but not too much shorter or else the printer fills up its buffer too fast. This function is not applicable for the C/T hotport.

Time Out

This is the value used by the printer to time out from the current port and check the other selected Port Types for data to print. When the printer has not received data from the host after a certain period of time, it needs to time out in order to service the other ports.

Report Status

- **Disable**. When a fault occurs on the printer, only the active port reports the fault to the host.
- **Enable**. The port will only report any fault even when it is not the current active port.

Host Interface: Centronics

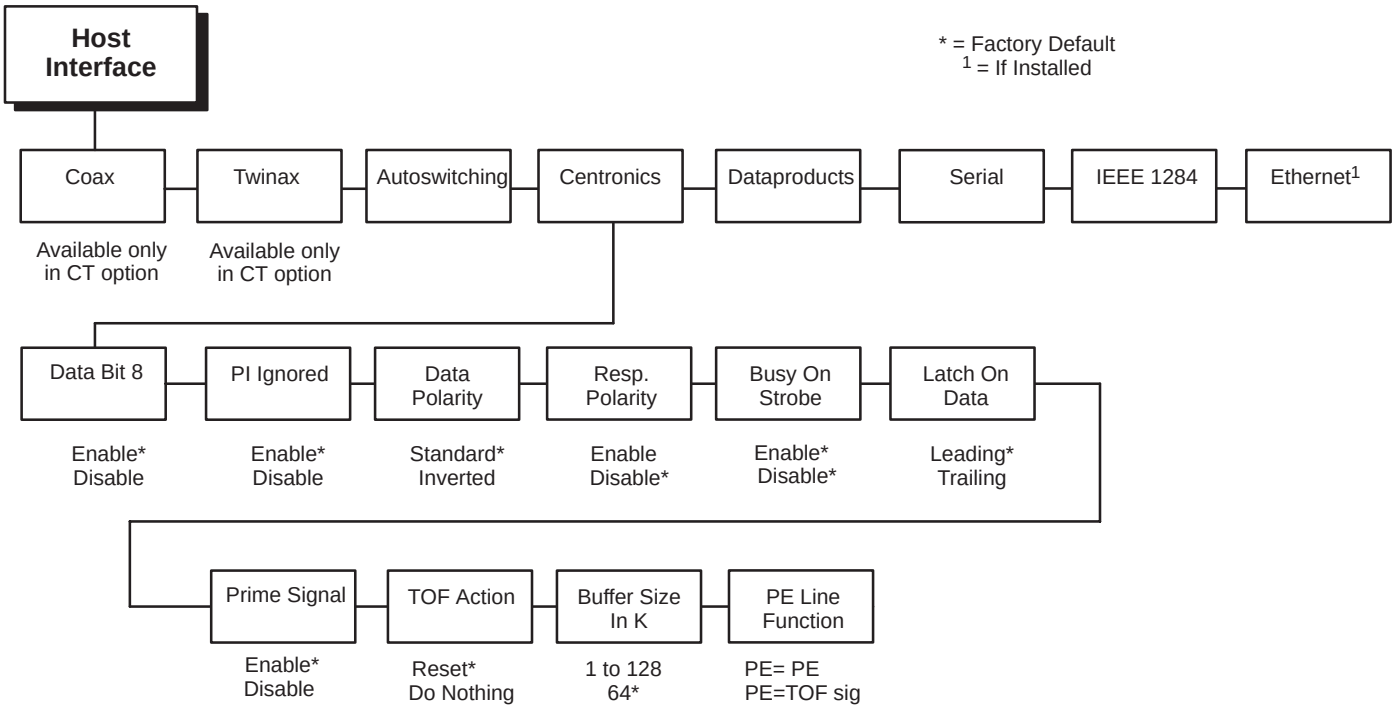


Figure 3–7. Host Interface Menu: Centronics

Data Bit 8

Enable: Allows access to the extended ASCII character set.

Disable: The printer interprets bit 8 of each incoming data character as a zero, regardless of its actual setting.

PI Ignored

The PI (Paper Instruction) signal controls vertical paper motion. It is dependent on your host computer.

Enable: Ignores the PI signal and treats the data as characters or control codes.

Disable: Causes the printer to interpret the eight data lines as VFU commands when the PI signal is true.

Data Polarity

This parameter must be set to match the Data Polarity of your host computer.

Standard: Does not expect the host computer to invert the data.

Inverted: Expects the data received on the data lines from the host computer to be inverted. Ones become zeros and vice versa.

Resp. Polarity

The Response Polarity parameter must be set to match the Response Polarity of your host computer.

Standard: Does not invert the response signal.

Inverted: Inverts the response signal sent to host computer.

Busy On Strobe

Enable: Asserts a busy signal only when the print buffers are full.

Disable: Asserts a busy signal after each character is received.

Latch On Data

Specifies whether the data is read on the leading (default) or trailing edge of the data strobe signal.

Prime Signal

Enable: The parallel port will do a warm start (reboot) if the host asserts the Prime Signal.

Disable: The parallel port will not do a warm start (reboot) if the host asserts the Prime Signal.

TOF Action

Reset : A form feed is done before a warm start when the Prime Signal is asserted from the host. This setting is only used if the Prime Signal parameter is asserted.

Do Nothing: Nothing occurs before a warm start when the Prime Signal is asserted.

Buffer Size In K

Configures the amount of memory allocated for the Centronics parallel port buffer. You can specify between 1 and 128 KBytes.

PE Line Action

The PE (Paper Empty) Line Action signal from the printer tells the host not to send any more data, then gives the TOF signal.

Host Interface: Dataproducts

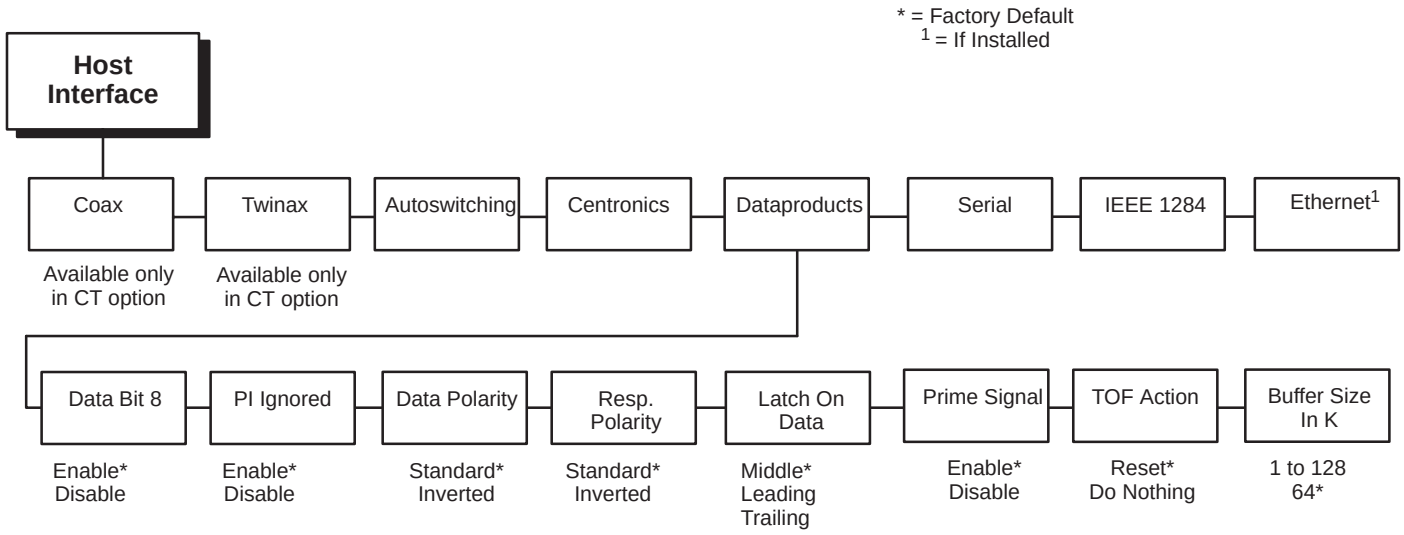


Figure 3–8. Dataproducts Menu

Data Bit 8

Enable: Allows access to the extended ASCII character set.

Disable: The printer interprets bit 8 of each incoming data character as a zero, regardless of its actual setting.

PI Ignored

The PI (Paper Instruction) signal controls vertical paper motion. It is dependent on your host computer.

Enable: Ignores the PI signal and treats the data as characters or control codes.

Disable: Causes the printer to interpret the eight data lines as VFU commands when the PI signal is true.

Data Polarity

This parameter must be set to match the Data Polarity of your host computer.

Standard: Does not expect the host computer to invert the data.

Inverted: Expects the data received on the data lines from the host computer to be inverted. Ones become zeros and vice versa.

Resp. Polarity

The Response Polarity parameter must be set to match the Response Polarity of your host computer.

Standard: Does not invert the response signal.

Inverted: Inverts the response signal sent to host computer.

Latch On Data

Specifies whether the data is read on the leading, middle (default), or trailing edge of the data strobe signal.

Prime Signal

Enable: The parallel port will do a warm start (reboot) if the host asserts the Prime Signal.

Disable: The parallel port will not do a warm start (reboot) if the host asserts the Prime Signal.

TOF Action

Reset : A form feed is done before a warm start when the Prime Signal is asserted from the host. This setting is only used if the Prime Signal parameter is asserted.

Do Nothing: Nothing occurs before a warm start when the Prime Signal is asserted.

Buffer Size In K

Configures the amount of memory allocated for the Dataproducts parallel port buffer. You can specify between 1 and 128 KBytes.

Host Interface: Serial

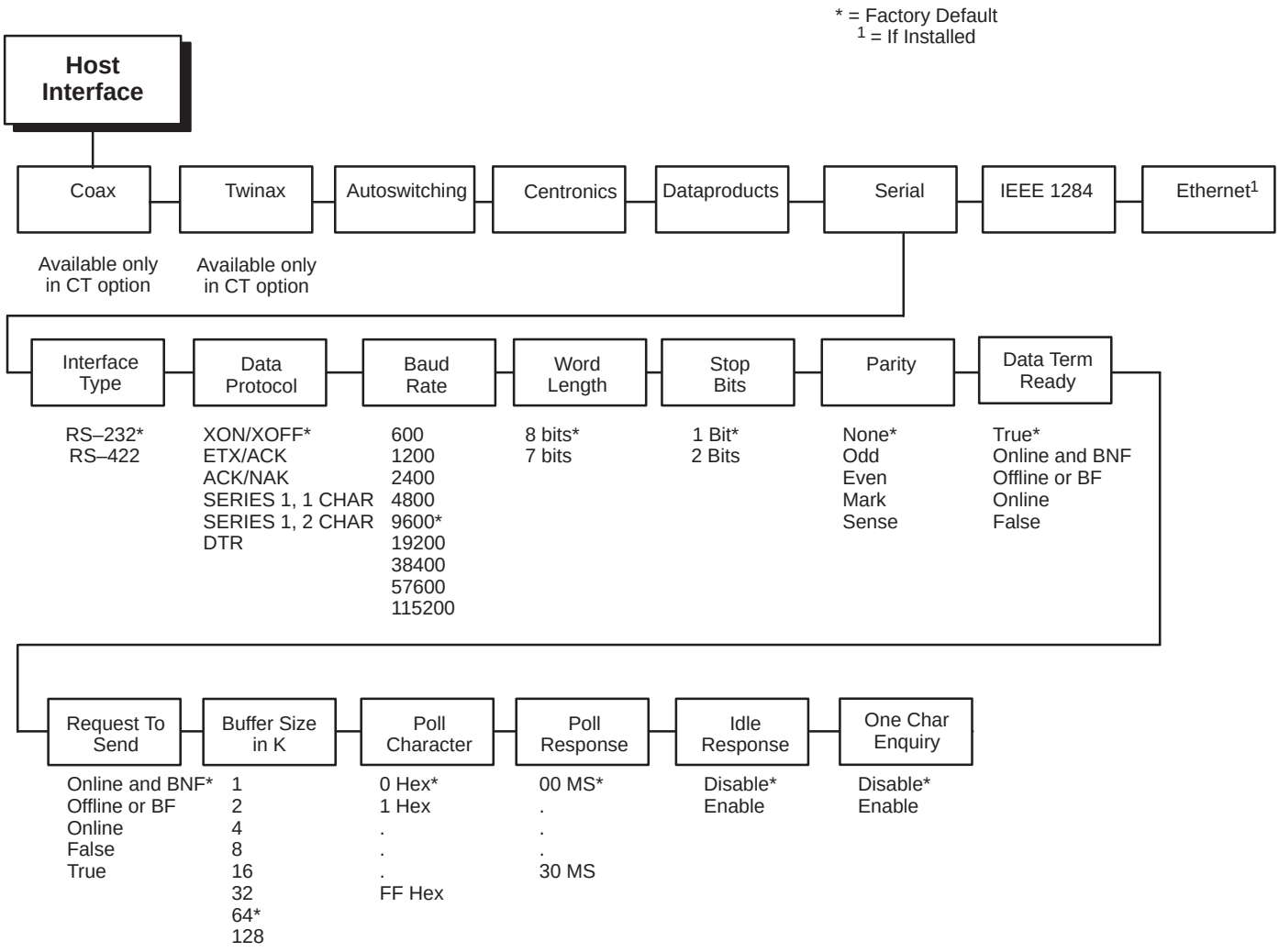


Figure 3–9. Serial Menu

Interface Type

This parameter allows you to select the RS–232 or RS–422 serial port interface.

Data Protocol

Values: XON/XOFF (default), ETX/ACK, ACK/NAK, SERIES 1, 1 CH, or SERIES 1, 2 CH, DTR.

This parameter must be set to match your host computer.

The Data Protocol parameter allows you to select the software flow control protocol.

The actions for each of the six possible parameter values are as follows:

XON/XOFF (default)

When you select the XON/XOFF protocol, the printer does the following:

- When not ready to receive data (i.e. offline or full data buffer), the printer sends ASCII code DC3 (Device Code 3, hex 13, XOFF) to the host.
- When ready to receive data (i.e. online and empty data buffer), the printer sends ASCII code DC1 (Device Code 1, hex 11, XON) to the host.

NOTE: XON means “transmit on;” XOFF means “transmit off.”

ETX/ACK

The ETX/ACK protocol enables the flow of communication to the printer by sending a block of data, and ending the block with an End of Text (ETX) signal. When the printer receives the ETX signal, it acknowledges the signal, thereby indicating it has received the entire block of data.

ACK/NAK

The ACK/NAK protocol gives the printer a means to acknowledge it has either accepted a transmission (ACK) or did not receive a transmission (NAK).

SERIES 1, 1 CH

When you select the Series 1 with 1 Character protocol, the printer does the following:

- When not ready to receive data (buffer 75% full) the printer sends a buffer full response character to the host.
- When ready to receive data (buffer drops to 50% full), the printer sends a buffer empty response character to the host.
- If the buffer ever fills completely, the printer sends a buffer full response character to the host every time it receives a character from the host.
- In addition, whenever the printer state changes from online to offline (or vice versa), the printer sends the appropriate response character to the host.

The printer uses different response characters to represent buffer full and buffer empty, depending on whether it is online or offline. These response characters are listed in the following table:

Online State	Buffer State	Response Character
Online	Buffer Empty	CR
	Buffer Full	3
Offline	Buffer Empty	0
	Buffer Full	2

With the SERIES 1 CH protocol selected, if the printer receives a Series 1 poll character from the host, the printer removes the poll character from its input data stream and discards it. After a delay, called the poll delay, the printer replies to the host by sending the appropriate response character, per the preceding table.

During a poll delay, if the printer receives another poll character, the printer merely discards it. However, if a transition (from buffer full to buffer empty or from online to offline) occurs during a poll delay, the printer sends the response character appropriate to the new printer state at the end of the delay.

If you enable the Series 1 Idle parameter, then whenever the buffer is less than 75% full, the printer sends a response character to the host every two seconds.

You can select the poll character and the poll delay time from the printer control panel. You can also enable or disable Series 1 Idle from the control panel. Descriptions of these parameters start on page 3–71.

NOTE: When using the SERIES 1, 1 CH protocol, be careful with the transmission of binary data (control codes, bit images, etc.) since the printer discards poll characters.

SERIES 1, 2 CH

When you select the Series 1 with 2 Characters protocol, the printer behaves exactly the same as the Series 1 with 1 Character protocol except that the printer sends two-character responses to the host. These response characters are listed in the following table:

Online State	Buffer State	Response Character
Online	Buffer Empty	1 CR
	Buffer Full	3 CR

Offline	Buffer Empty	0 CR
	Buffer Full	2 CR

NOTE: When using the SERIES 1, 2 CH protocol, be careful with the transmission of binary data (control codes, bit images, etc.) since the printer discards poll characters.

DTR Protocol

The printer controls the data flow by sending this hardware signal to the host. If there is enough room in the printer buffer, the printer will send a high signal; if the buffer is full, the printer will send a low signal. DTR tells the host if it is safe to send more data. (If the host sends data during an unsafe condition, data will be lost.) DTR is not available when RS–422 is selected.

Baud Rate

Values: 600, 1200, 2400, 4800, 9600 (default), 19200, 38400, 57600, 115200 Baud.

Sets the baud rate of the serial interface in the printer. Baud rate is the speed at which serial data is transferred between the host computer and the printer. The choices for the RS–232 and RS–422 interfaces are 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200 Baud.

NOTE: If you select a baud rate that is greater than 19200, you will need to use RS–422 to prevent data loss.

Word Length

Values: 7 or 8 (default) bits

Sets the length of the serial data word. The length of the data word can be set to 7 or 8 bits, and must match the corresponding data bits setting in the host computer.

Stop Bits

Values: 1 (default) or 2.

This parameter must be set to match your host computer.

Stop bits signal the end of a transferred serial data word.

Parity

Values: None (default), Odd, Even, Mark, and Sense

This parameter must be set to match your host computer.

The host may send a parity bit with every data word. The parity bit is used for error checking.

Data Term Ready

Values: Online & BNF, True (default), False, Offline or BF, or Online

This parameter must be set to match your host computer.

The DTR Function parameter is part of hardware flow control. This parameter determines when the printer generates the Data Terminal Ready (DTR) signal to the host computer. DTR is a status signal that the printer sends to the host to indicate whether or not the printer is ready to receive data.

- The True parameter setting causes the printer to continuously assert the DTR signal.
- The False setting causes the printer to never assert the DTR signal.
- The Online & BNF (buffer not full) setting causes the printer to assert the DTR signal only when the printer is online and its internal serial buffer is not full.
- The Offline or BF (buffer full) asserts the DTR signal when the printer is off-line or the internal serial buffer is full.
- The Online setting causes the printer to assert the DTR signal whenever the printer is online.

Request To Send

Values: Online & BNF (default), True, False, Offline or BF, or Online

This parameter must be set to match your host computer.

The Request To Send parameter is part of hardware flow control. This parameter determines when the printer generates the Request To Send (RTS) signal to the host computer. RTS is a status signal that the printer sends to the host to indicate whether or not the printer is ready to receive data.

- The True parameter setting causes the printer to continuously assert the RTS signal.
- The False setting causes the printer to never assert the RTS signal.
- The Online & BNF (buffer not full) setting (the default setting) causes the printer to assert the RTS signal only when the printer is online and its internal serial buffer is not full.
- The Offline or BF (buffer full) asserts the RTS signal when the printer is off-line or the internal serial buffer is full.
- The Online setting causes the printer to assert the RTS signal whenever the printer is online.

Buffer Size In K

Values: 1 – 128 (64 default)

This parameter reflects the size in K of the printer's data buffer.

Poll Character

Values: The allowable range is hex 0 through FF. The default value for this parameter is 0.

This parameter selects the character that the printer recognizes as the Series 1 poll character.

NOTE: This parameter is used only with the SERIES 1, 1 CH and SERIES 1, 2 CH protocols. See page 3–31 for more information.

Poll Response

Values: 0 to 30 MS. The default value for this parameter is 0+ Msec.

This parameter selects the Series 1 delay time, in milliseconds, that the printer waits prior to sending the Series 1 response to the host.

NOTE: This parameter is used only with the SERIES 1, 1 CH and SERIES 1, 2 CH protocols. See page 3–31 for more information.

Idle Response

Values: Enable or Disable (default)

If you enable the Series 1 Idle parameter, then whenever the buffer is less than 75% full, the printer sends a response character to the host every two seconds.

NOTE: This parameter is used only with the SERIES 1, 1 CH and SERIES 1, 2 CH protocols. See page 3–31 for more information.

One Char Enquiry

Values: Enable or Disable (default)

The One Char Enquiry mode uses the Poll Character to detect a request from the host and sends a response back to the host. This option also allows you to turn this feature on and off.

Host Interface: IEEE 1284 Parallel Parameters

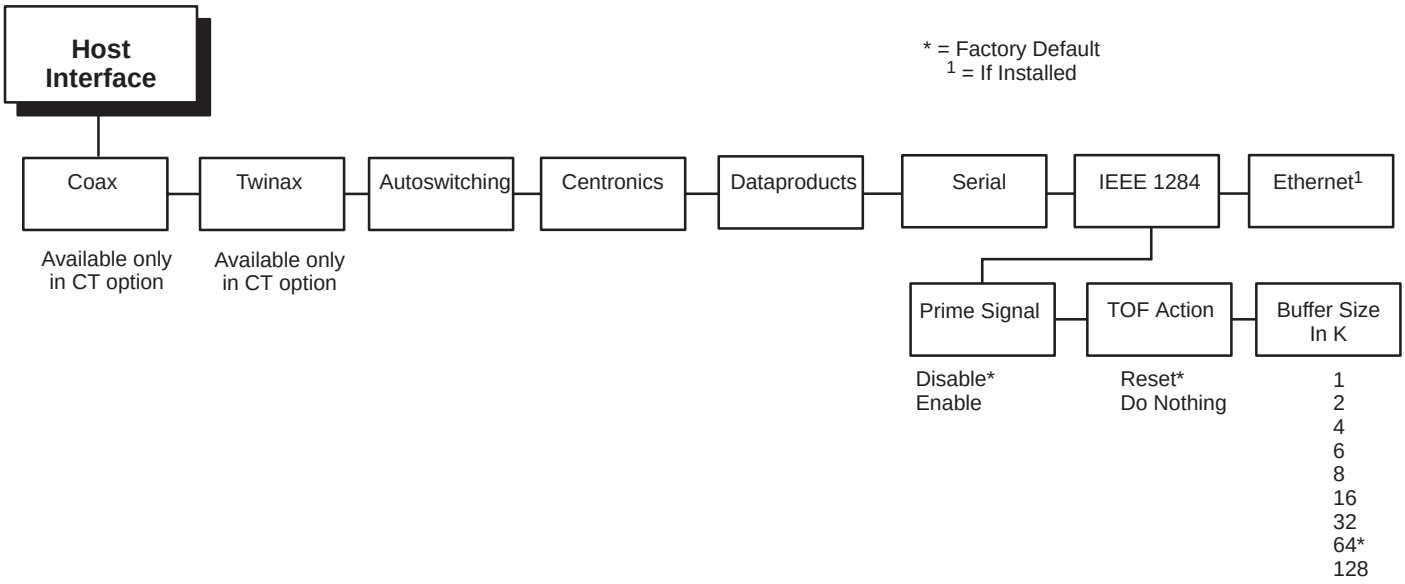


Figure 3–10. IEEE 1284 Menu

The IEEE 1284 interface is faster and more versatile than that of the Centronics interface and supports bidirectional communication. The configuration of this interface is controlled from the host.

Prime Signal

- **Enable**. This parallel port will perform a warm start (reboot) when the host asserts the Prime Signal.
- **Disable**. This parallel port will not perform a warm start (reboot) when the host asserts the Prime Signal.

TOF Action

- **Reset**. A form feed is done before a warm start when the Prime Signal is asserted from the host. This setting is used only if the Prime Signal parameter is asserted.
- **Do Nothing**. Nothing occurs before a warm start when the Prime Signal is asserted from the host.

Buffer Size In K

This option configures the amount of memory allocated for the IEEE 1284 parallel port buffer. You can specify between 1 and 128 KBytes.

Ethernet Parameters Menu

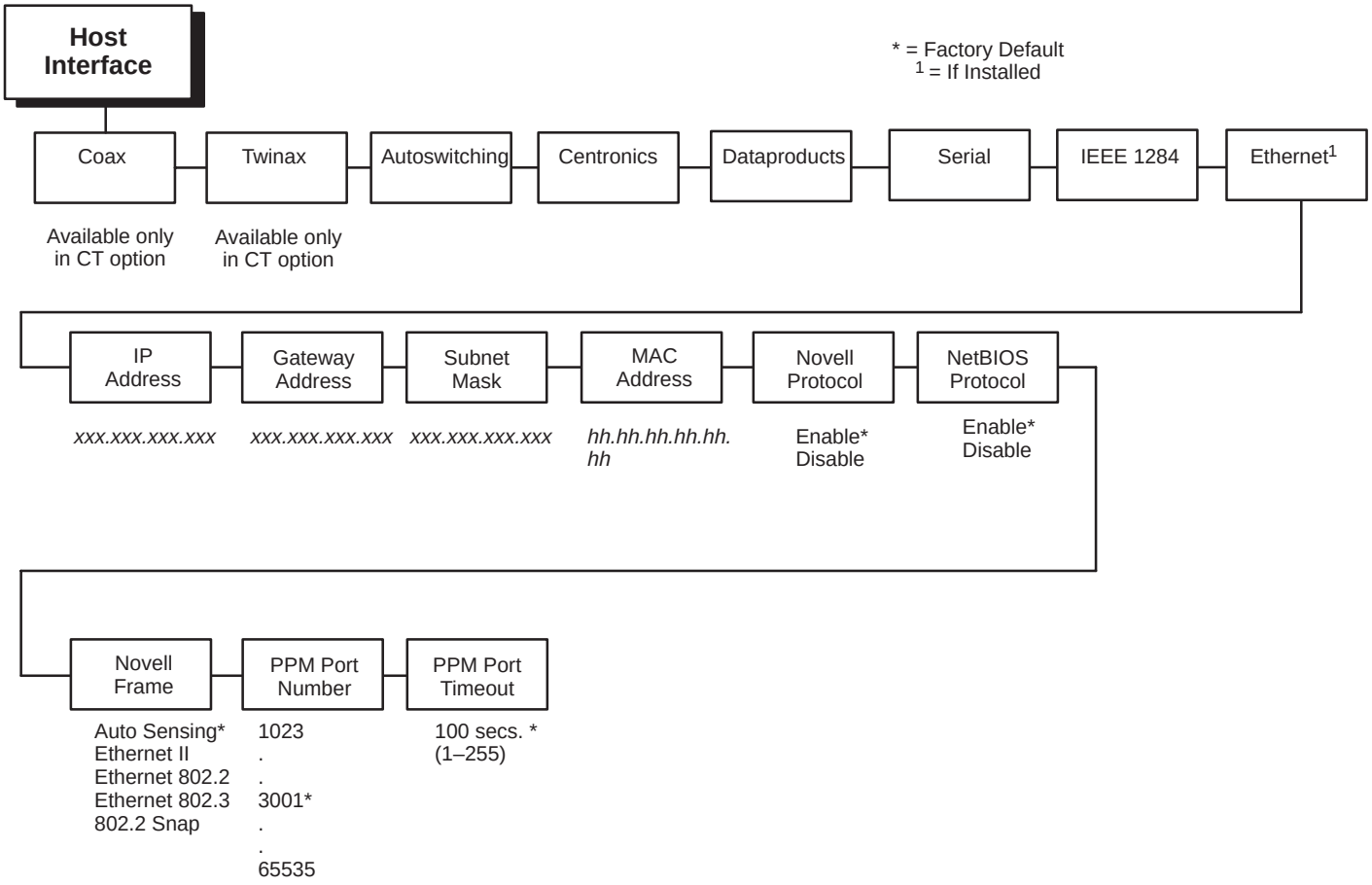


Figure 3–11. Ethernet Params

The ETHERNET PARAMS menu enables you to set up your printer so it can communicate on a network. For information on assigning the IP Address, Gateway Address, Subnet Mask and MAC Address, refer to the *PrintNet User's Manual*. You may also enable or disable the Novell or NetBIOS Protocols within this menu, as well as selecting which Novell Frame scheme is used in processing Novell signals. See the Novell chapter in the *PrintNet User's Manual* for more details.If the printer is connected to a Printer Manager utility, the PPM Port number and PPM Port Timeout settings must match the settings in the Printer Manager program. See the appropriate *Printer Manager Manual* for details.

Paper Control Menu

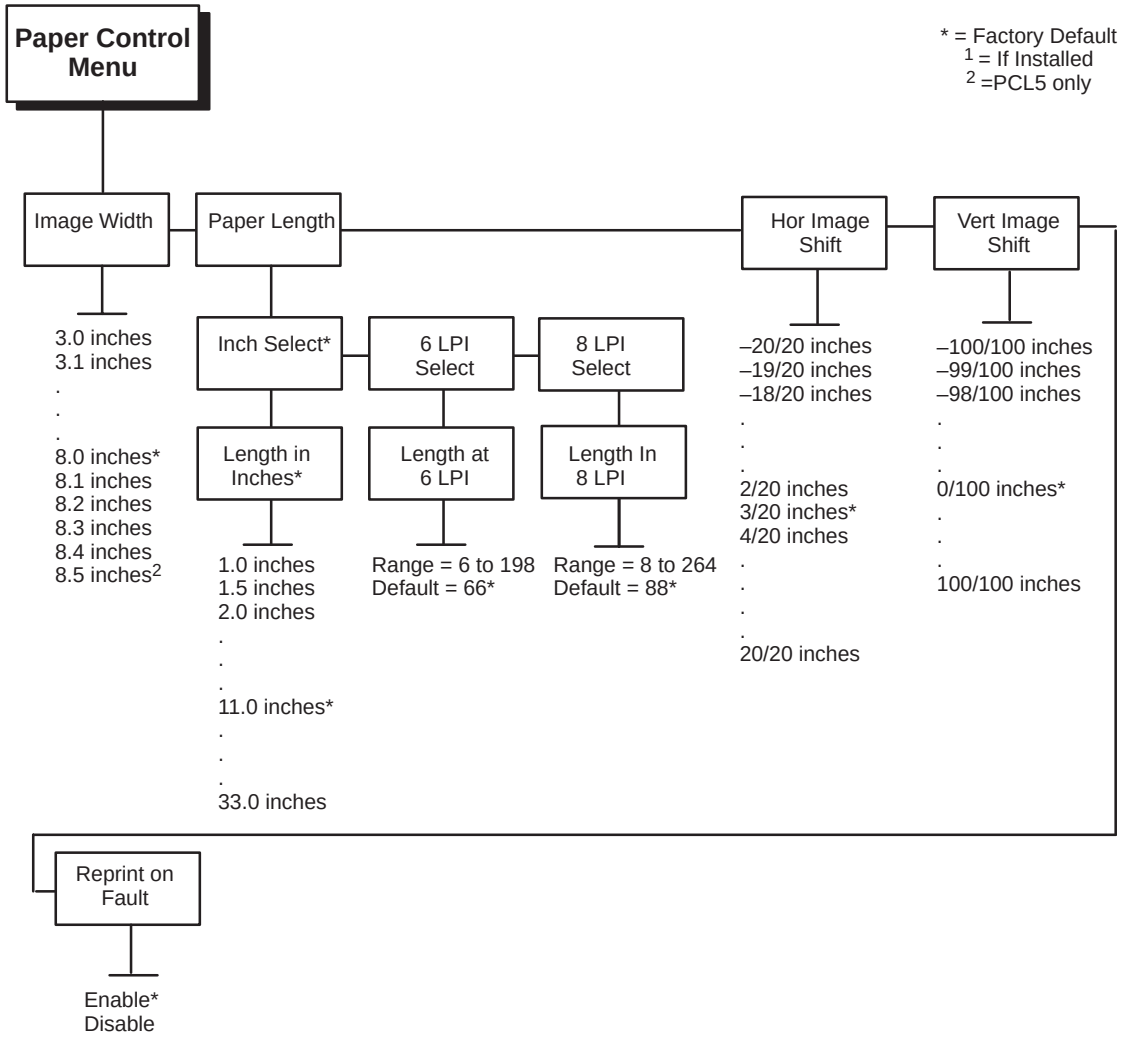


Image Width

Image Width specifies the width of the image to be printed. The allowable range is 3.0 to 8.2 inches, in 0.1 inch increments. The factory default is 8.0 inches (8.5 inches for the PCL5 emulation only).

Paper Length

Paper Length is the physical form length for fanfold paper (the vertical perforation to perforation distance). You can specify the paper length three ways: Inches or the number of print lines (at six or eight lines per inch).

- Inch Select/Length in Inches (the default). This selection allows you to set the form length in inches. The range is from 1.0 to 33.0 inches, in one–half inch increments. The default is 11.0 inches.
- 6LPI Select/Length at 6 LPI. This menu selection allows you to set the paper length in lines. The range is from 6 to 198 lines, in 1 line increments. The default is 66 lines.
- 8LPI Select/Length at 8 LPI. This menu selection allows you to set the paper length in lines. The range is from 8 to 264. The default is 88 lines.

Horizontal Image Shift

Horizontal Image Shift specifies the amount to shift an image to the right for precise positioning on the page. The actual width of the image is not affected. The allowable range is –20/20 to 20/20 inches, in 1/20 inch increments. The default is 3/20 inches.

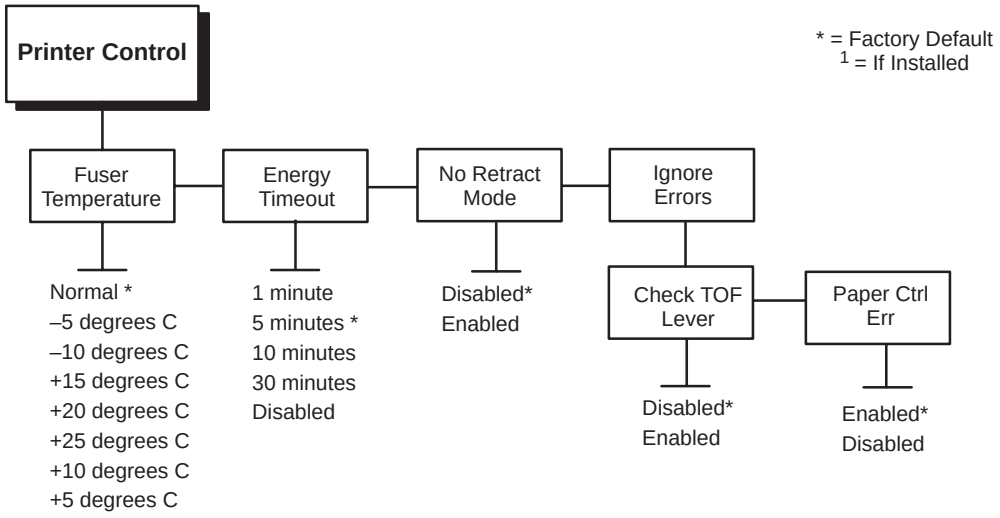
Vertical Image Shift

Vertical Image Shift specifies the amount to shift an image down for precise positioning on the page. The actual height of the image is not affected. The allowable range is –100/100 to 100/100 inches, in 1/100 inch increments. The default is 0/100 inches.

Reprint on Fault

Reprint on Fault enables (default) or disables automatic reprinting after a fault condition occurs.

Printer Control Menu



Fuser Temperature

The fuser temperature option allows you to reduce the normal temperature of the fuser by up to –10 C or increase to +25 C. A temperature reduction may be required due to the print media. For example, thinner material may curl or waffle at high temperatures and adhesive material on label material may melt. It is necessary to lower fuser temperature in such cases. The selections on the control panel are: Normal (this is the default selection), –5 degrees C, –10 degrees C, +15 degrees C, +20 degrees C, +25 degrees C, +10 degrees C, and +5 degrees C.

Energy Timeout

The energy timeout option provides the ability to select the length of time before the printer goes into the energy saving mode. From the energy saving mode, the printer will require warm up time to bring the fuser to the configured temperature. Energy is saved by turning off heater power to the fuser. The timeout selections are: 1 minute, 5 minutes (this is the default selection), 10 minutes, 30 minutes, and Disabled.

No Retract Mode

The default is Disabled. In this mode, the paper will retract into the printer while printing. If enabled, the paper will not retract into the printer while printing.

The printer completes each print job by fusing the toner on the last page and advancing the last page to exit the printer. To print the next job, the printer must retract the paper from outside the printer to prevent white space (blank pages) from occurring between printed pages. This is the normal printing mode (default).

Some types of media can snag when retracted into the printer.

NOTE: Set the No Retract Mode to Enable to prevent paper from retracting into the printer.

Ignore Errors

If Enabled, the printer will ignore minor paper motion errors when they occur while printing. Paper jams and critical errors will continue to be reported. If disabled, the printer will report all errors when they occur.

Check TOF Lever

Default is Disabled. In this mode, the printer will signal the user to check the TOF lever. If enabled, the printer will not signal the user to check the TOF lever.

NOTE: Set to Enable if False “09 Check TOF Lever” error messages occur while printing.

Paper Control Error

Default is Enabled. In this mode paper control errors will not be reported by the printer. If Disabled, paper control errors will be reported by the printer.

NOTE: Set to Disable if paper jams occur in the fuser area but are not detected and reported.

Maint./Misc.Menu

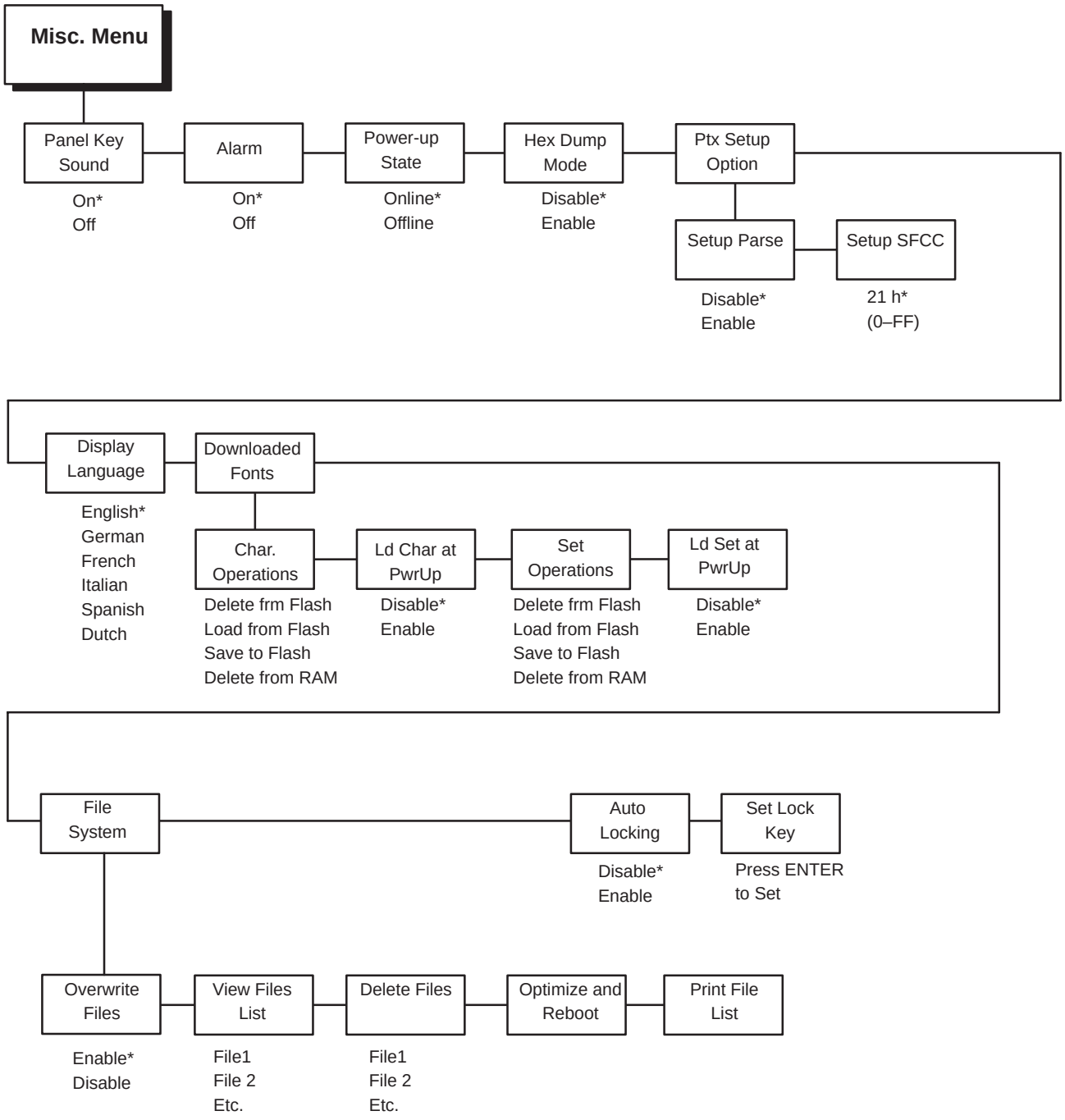


Figure 3–12. Maintenance/Miscellaneous Menu

Panel Key Sound

Values: On (default) and Off

This option allows you to configure the printer to beep when you press a key (switch).

Alarm

Values: On (default) and Off

This option allows you to configure the printer to beep when a printer fault condition occurs.

Power-up State

Values: Online (default) and Offline

This option allows you to configure the printer to power-up in the offline or online state.

Hex Dump Mode

Values: Disable (default) and Enable

This option allows you to place the printer into the “hex dump” mode, in which the printer will output a hexadecimal data stream.

When enabled, the hex dump mode translates all host interface data to its hexadecimal equivalent, then prints the hex code and its printable symbol, if one exists. Figure 3–13 shows a partial example of a hex dump.

All characters printed after entering the hex dump mode (including any in the input buffer) are printed in two forms: as a two-symbol hexadecimal code and as its printable symbol, if any. A non-printable code is printed as a period [.] symbol. Up to 16 characters can be printed per line. No control codes will be acted upon by the printer while in hex dump mode.

The 16 characters are formatted so that the 16 printable symbols are printed in columns 1 through 16. The 17th column is blank. Column 18 contains either a “p” (PI line active) or a blank (PI not active). Columns 19 and 20 contain the hexadecimal code for the first character, followed by a blank. The PI line condition and hexadecimal code for the second character is printed in columns 22, 23, and 24, followed by a blank. The hexadecimal code for the 16th character is printed in columns 78, 79, and 80.

Subsequent printing observes the current setting for skip-over perforation, form length, and top-of-form position parameters.

Cancel the hex dump mode (while off-line), by disabling it from the control panel. The paper then may be advanced to the next top-of-form.

If a fault occurs while printing a hex dump, the printer reverts to the normal fault state. When the fault is cleared, the printer resumes printing the hex dump (either a partial line with a form feed, or nothing at all). Top-of-form remains unaffected.

The Impact Print	54	68	65	20	49	6D	70	61	63	74	20	50	72	69	6E	74
er Emulation pri	65	72	20	45	6D	75	6C	61	74	69	6F	6E	20	70	72	69
nts in one–up, t	6E	74	73	20	69	6E	20	6F	6E	65	2D	75	70	2C	20	74
wo–up, and four–	77	6F	2D	75	70	2C	20	61	6E	64	20	66	6F	75	72	2D
up page windows,	75	70	20	70	61	67	65	20	77	69	6E	64	6F	77	73	2C

Figure 3–13. Example of Hex Dump

PTX Setup Option

Values: Setup Parse and Setup SFCC

This option provides the ability to enable or disable the setup parse and to select the Special Function Control Code (SFCC).

Setup Parse controls the use of PTX setup commands from the host computer. With the option enabled, PTX setup commands are used. With the option disabled, PTX setup commands are not used (this is the default).

Setup SFCC allows you to choose the special function control code to be used with your application. Any single hexadecimal control code between hex 01 and FF can be selected.

Display Language

Values: English (default), French, German, Italian, Spanish, and Dutch

This option is used to select the language for the control panel display. This selection will change the display of all information on the LCD.

Downloaded Fonts

Allows you to download a substitution table to replace any character in the current character set with a different character in the same font.

- **Char Operations**. Allows you to delete, load, and save a character from flash and delete a character from RAM.
- **Ld Char at PwrUp**. Allows you to disable or enable loading up a character at power up.
- **Set Operations**. Allows you to delete, load, and save a character from flash and delete a character from RAM.
- **Ld Set at PwrUp**. Allows you to disable or enable loading up a character at power up.

File System

Overwrite

Allows you to prevent files from being overwritten by disabling the overwrite function.

View File List

Displays the list of all files in the file system. Pressing the DOWN key displays the file size.

Delete Files

Displays the list of all files in the file system. Pressing the ENTER key deletes the file displayed on the front panel.

Optimize and Reboot

Reclaims flash space from deleted flash files. After pressing ENTER, wait for the printer to reboot.

Print File List

Prints a summary of the files stored in flash memory and several statistics on File System Usage.

Font Memory Menu

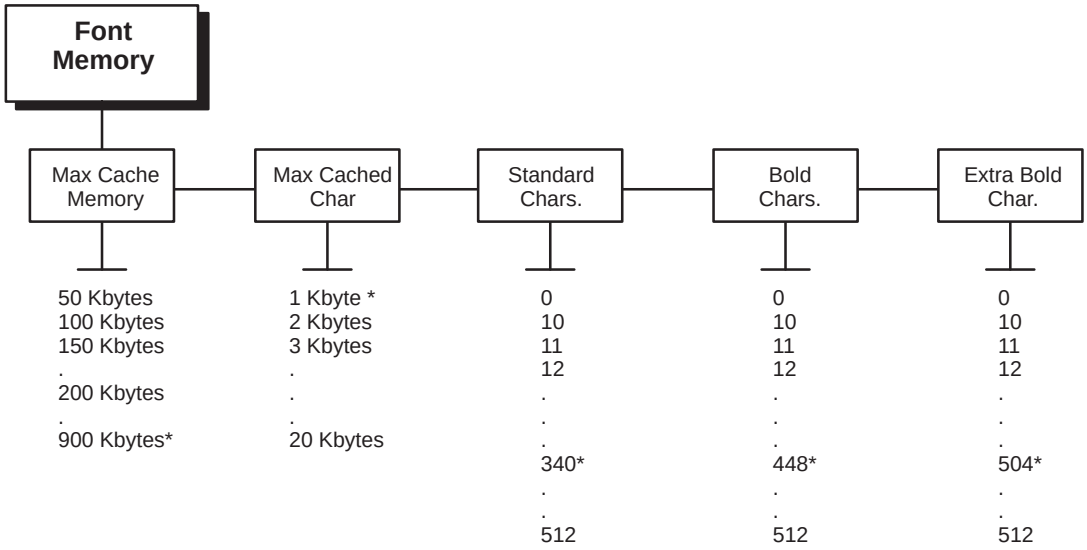


Figure 3–14. Font Memory Menu

NOTE: For most applications, the default settings for font memory will be acceptable. Therefore, do not change the defaults unless your application requires an uncommon font memory configuration.

Activating Font Memory Options

After selecting any of the “Font Memory” options, perform the following steps to activate the new value:

1. Save your configuration changes. See the Config. Control menu option “Saving Configurations” on 3–6.
2. Change the power-up configuration to match the configuration you just saved. See Config. Control menu option “Power Up Configuration” on 3–19.
3. Turn the printer power off and then on again.

Max Cache Memory

The Maximum Cache Memory option specifies the size of the memory block that can be allocated to the font cache. The font cache stores bitmaps that are

created on demand from the font outlines stored in Flash memory. The cache allows the printer to print scalable fonts at optimum speed.

To calculate the memory required, use this equation:

$$\frac{\text{horizontal resolution} \times \text{vertical resolution} \times \text{character height (inches)} \times \text{character width (inches)} \times \text{\# of characters to be cached}}{8}$$

The allowable range is 50 KBytes to 900 KBytes, in 50 KByte increments. The default value for this parameter is 900 KBytes.

Maximum Cached Char

The Maximum Cached Characters option specifies the size of the largest character that can be stored in the font cache. To calculate the memory requirement, use this equation:

$$\frac{\text{horizontal resolution} \times \text{vertical resolution} \times \text{character height (inches)} \times \text{character width (inches)}}{8}$$

For example, if an application requires the use of a character that is 1 inch high by 1 inch wide, calculate the Maximum Cached Characters value as follows:

$$\frac{300 \times 300 \times 1 \times 1}{8} = 11{,}250$$

Therefore, select a value that is equal to or greater than 11,250. The closest available value is 12 KBytes.

The allowable range is 1 KBytes to 20 KBytes, in 1-KByte increments. The default value for this parameter is 1 KBytes.

Standard Chars.

The Standard Chars option specifies the thickness or stroke weight of the text fonts. The allowable range is 0 to 512, in increments of 1. The default is 340.

Bold Chars.

The Bold chars option specifies the thickness or stroke weight of the text fonts. The allowable range is 0 to 512, in increments of 1. The default is 448.

Extra Bold Char.

The Extra Bold Char option specifies the thickness or stroke weight of the text fonts. The allowable range is 0 to 512, in increments of 1. The default is 504.

Engine Life Data

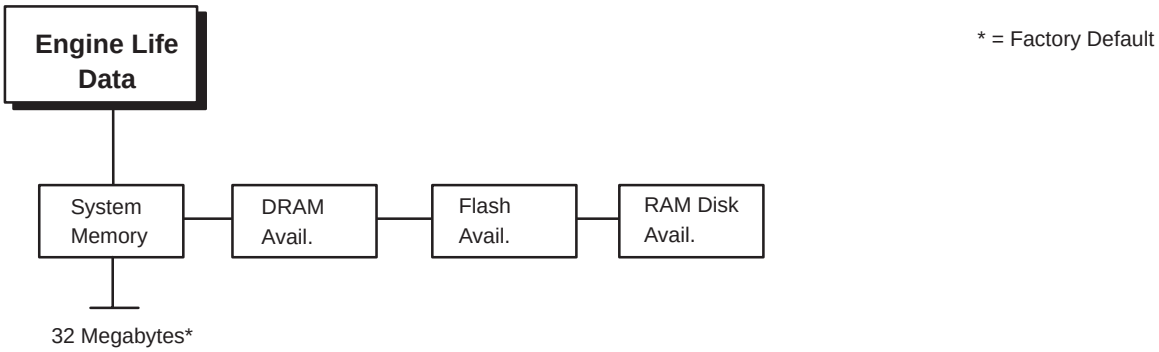


Figure 3–15. Engine Life Data Menu

System Memory

The L1524 printer has 32MB of RAM (Random Access Memory). This is the standard with all new printer shipments, and all upgraded printers. The 32 MB of RAM exceeds the amount previously specified for optimal speed for all currently available system configurations.

DRAM Available

This displays the amount of DRAM currently available.

Flash Available

This displays the amount of Flash memory currently available.

RAM Disk Available

This displays the amount of RAM disk space currently available.

System Info

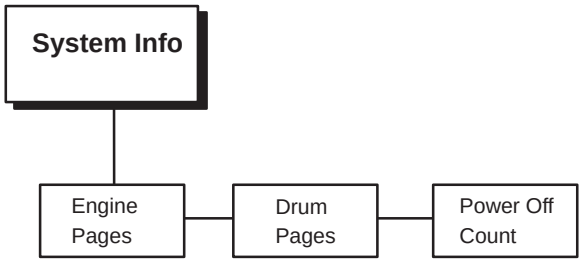


Figure 3–16. System Info

System Info provides you with information concerning page count and power off count. This data is used by the controller to determine the proper time to replace consumables. The power off count is used to identify the proper time to replace the EPROM. The specific information provided on the control panel is:

Engine Pages

Drum Pages

Power Off Count

Loading Flash Memory

Printer emulation and operating system software are loaded into flash memory at the factory, but you will install software or files in the following situations:

- You buy the PGL or VGL graphics, PrintNet, Expansion-CT, or IPDS option after the printer is installed
- You need to upgrade printer software
- You need different emulation software
- You have replaced the controller board
- You have added or replaced the flash memory card
- You need to load logos, forms, TIFF files, setup files, and/or font files to the printer

Emulation software and fonts are supplied on floppy diskettes. Each emulation file is “executable,” which means you can expand it and copy it into the printer’s flash memory with a single command. The other kinds of files are not executable; however, before they can be downloaded, you might need to convert them into

downloadable format. You can then copy them to the printer's flash memory as binary data files, as instructed later in this section.

The procedures that follow assume that you are familiar with DOS file commands.

The CNVT2FLS Utility Program

The CNVT2FLS program is a DOS utility that is supplied with the emulation software. This utility converts logo, form, TIFF, setup, and font files into downloadable format.

To convert files into downloadable format, do the following:

1. Create a directory on the hard drive and copy the CNVT2FLS utility to that directory.
2. Copy all of the files to be converted to the directory where the CNVT2FLS utility resides.
3. Change to the drive and directory where the CNVT2FLS utility resides.
4. To display a brief help message, at the DOS prompt, enter the command name CNVT2FLS with no parameters:

   CNVT2FLS <Return>

   You will then see a help message similar to the following:

```
USAGE:

  CNVT2FLS file_name1 file_name2 file_name3 A <return>

  or

  CNVT2FLS file_name1 file_name2 file_name3 A FONT <return>

  file_name1: Input file name to be converted from.

  file_name2: Output file name for file download.

  file_name3: Flash file name to be stored in file system
  after download.

  hw_type:    Specify  A  all the time.

  FONT: Optional, specify  FONT if this is a font file.
```

- The first file name following the command name is the name of the input file that you want to convert. (There are no restrictions on the filename or extension.)
- The second file name is the name of the downloadable output file, which the utility will create. (Again, there are no restrictions on the filename or extension.)
- The third file name is the name of the output file as it will be stored in the flash memory after downloading and later displayed on the printer LCD menus. (The filename and extensions *must* conform to the format described below.)
- The "A" parameter in the command line is a fixed parameter that must always be entered.
- If the file being converted is a font file, enter "FONT" following the "A" parameter on the command line. If the file is not a font file, omit "FONT."

IMPORTANT

Be sure that you always enter the "A" parameter on the CNVT2FLS command line, as indicated above.

When the CNVT2FLS utility runs, it reads the file named *file_name1* and creates the file named *file_name2*. The file named *file_name2* is a flash downloadable file that can be copied and downloaded to the printer, as detailed later in this section. The utility takes the filename you specify for *file_name3* and stores this information within the downloadable output file (*file_name2*). The *file_name3* file name is used by the printer to determine the type of file (font, logo, etc.) that has been downloaded.

IMPORTANT

The printer uses the file extension of *file_name3* to determine the type of file that has been downloaded. If you are downloading font files, use the extensions *.sf*, *.ttf*, or *.fnt*, depending on the original font type extension. If you are downloading PGL logos or forms, use the extensions *.lgo* or *.frm*, as appropriate. If you are downloading an LP+, PGL, or VGL printer setup file, use the full name *setup.ptx*.

5. To convert a font file, enter the following at the DOS prompt on the computer, for example:

   CNVT2FLS custom.sf custom.dwn custom.sf A FONT <Return>

   where *custom.sf* is the name of one of the font files you want to convert. This command converts the specified font file, creating the downloadable file *custom*.dwn.

6. Repeat step 5 for any additional font files to be converted.

7. To convert a setup file, enter the following at the DOS prompt, for example:

   CNVT2FLS setup.ptx setup.dwn setup.ptx A <Return>

   where *setup.ptx* is the name of one of the setup files you want to convert. This command converts the specified setup file, creating the downloadable file *setup*.dwn.

8. Repeat step 7 for any additional setup files to be converted.

9. To convert other kinds of files (a logo or form file, for example), enter the following at the DOS prompt, for example:

   CNVT2FLS my_logo.xxx my_logo.dwn my_logo.lgo A <Return>

   where *my_logo.xxx* is the name of one of the form or logo files you want to convert. This command converts the specified logo or form file, creating the downloadable file *my_logo*.dwn.

10. Repeat step 9 for any additional logo and form files to be converted.

11. Proceed to the next section to download the converted files.

IMPORTANT

Be sure that you always enter the "A" parameter on the CNVT2FLS command line, as indicated above.

Downloading into Flash Memory

IMPORTANT

When downloading an emulation to the printer, all other optional font files, customer-supplied logos, and setup files will be erased. You will then need to reload these files. Before starting a download procedure, be sure that you have all of the necessary installation files on hand.

CAUTION

Do not interrupt the downloading process. Interrupting a download will damage the flash memory on the controller board and the PrintNet card.

To download emulation software, as well as downloadable files for logos, forms, TIFF, setup, and fonts to the printer, do the following:

1. If you plan to download any logo, form, TIFF, setup, or font files into the printer, you must first use the supplied `CNVT2FLS` DOS utility program to convert these files into downloadable format. See the last section, "The `CNVT2FLS` utility program." (Emulation files require no conversion.)

2. If you are using the PrintNet Ethernet interface, refer to the *Printnet User's Manual* for download instructions.

3. Take the printer offline by pressing the **ON LINE** key. Press the UP + DOWN keys (or the combination selected by the user) simultaneously to unlock the **ENTER** key.

4. Make a printout of *all* saved configurations. (Installing new software erases all saved configurations. You will use the printouts later to restore the printer configuration.)

NOTE: Loading flash memory does not affect the page count or other data stored in NVRAM.

5. Set the printer power switch to O (off).

6. If the printer is already connected to the parallel port of an IBM-compatible computer that is using the PC-DOS™ or MS-DOS® operating system, skip to step 12. If not, continue with step 7.

7. Unplug the printer AC power plug from its electrical outlet.

8. Disconnect all data input cables from the printer interface.

9. Connect a parallel data cable to the default parallel port (LPT1) of an IBM-compatible computer that is using the PC-DOS or MS-DOS operating system.

NOTE: You can connect the cable to the LPT2 port if the LPT1 port is already in use. If you use the LPT2 port, the download command is different, as described in the note after step 33.

10. Connect the parallel data cable to the parallel port of the printer.

11. Plug the printer AC power plug into its electrical outlet.

12. Power on the computer.

13. Set the printer power switch to | (on).

14. If you have no emulation software to install and you are installing only logo, form, TIFF, setup, or font files, skip to step 32. If you do have emulation software to install, continue with step 15.

15. Set the printer power switch to O (off).

16. The emulation is supplied on one or more diskettes. You must first recombine the multiple files from the diskettes into one file on your computer's hard drive. Create a directory on your computer hard drive where you will store the recombined files from the emulation diskettes by typing the following at the DOS prompt:

    MD DOWNLOAD <Return>

17. Make the newly-created directory the "active" directory by typing the following at the DOS prompt:

    CD DOWNLOAD <Return>

18. Insert the *last* emulation diskette in the series (e.g., 2 of 2, 3 of 3, etc.) into diskette drive A (or B) of the computer.

19. Get the name of the compressed emulation file on the diskette by typing the following at the DOS prompt:

    DIR A: <Return>

    (If the diskette is in drive B, type **B: <Return>**)

    The file name of the compressed file on the diskette takes the form *part_num*.zip, for example 123456.zip.

20. At the DOS prompt type:

    A:\PKUNZIP A:*part_num*

    where ***part_num*** is the six digit number you noted in the previous step.

    (Replace **A:** with **B:** if you are using the B drive.)

21. The PKUNZIP® program will execute, and the following message will appear on the computer screen:

    Insert disk #1 – Press a key when ready

22. Remove the diskette in the disk drive and insert the diskette labeled

    Disk 1 of 2 (or 1 of 3, etc.)

23. Press the <Return> key on the computer. After the file is expanded to the hard drive, the following message will appear on the computer screen:

    Insert disk #2 – Press a key when ready

24. Remove the diskette in the disk drive and insert the diskette labeled

    Disk 2 of 2 (or 2 of 3, etc.)

25. Press the <Return> key on the computer. If there are only two diskettes for the emulation, you will be returned to the DOS prompt when the expansion is complete. If there are more than two diskettes, you will be asked to insert disk #3 and press a key. Continue in this manner until you have inserted all of the emulation diskettes and the DOS prompt has returned.

26. Type the following at the DOS prompt:

    DIR <Return>

    You will see a directory listing containing the file ***part_num*.exe,** where the filename is the six digit number (e.g., 123456.zip) you noted above. Write down the complete name of the file with the `.exe` extension. **This is the file you will download into the printer.**

27. On the printer control panel, press and hold down the **ON LINE+PAGE EJECT** keys. Without releasing the keys, power the printer on. Continue holding the **ON LINE** and **PAGE EJECT** keys down for five seconds, then release.

28. When you see "WAITING FOR FILE DOWNLOAD" on the LCD, at the DOS prompt on the computer type, for example:

    123456.exe –pb <Return>

    where `123456.exe` is the emulation file you noted in step 26 (for an emulation on multiple diskettes) This command expands the emulation file, then copies it as a binary file into the flash memory in the printer.

NOTE: If you are downloading the file using the LPT2 port on the computer, enter the following DOS command, for example:

123456.exe –pb2 <Return>

29. While the file is being copied into memory, the printer LCD informs you of the load process and status. (Messages are listed in the table on page 3–60.)

30. Wait until the new program has successfully loaded into printer memory.

31. If you have any additional software to install (logo, form, TIFF, setup, or font files), continue with step 32. If you have no additional software to install, skip to step 43

32. Set the printer power switch to O (off).

33. On the printer control panel, press and hold down the **ON LINE+PAGE EJECT** keys. Without releasing the keys, power the printer on. Continue holding the **ON LINE** and **PAGE EJECT** keys down for five seconds, then release.

34. When you see “WAITING FOR FILE DOWNLOAD” on the LCD, release the **ON LINE** and **PAGE EJECT** keys.

35. If the software to be installed is already on the hard drive, change to the drive and directory where the software resides, then skip to step 38. If the software to be installed is on diskette, continue with step 36.

36. Insert the diskette containing the software to be installed into diskette drive A (or B) of the computer.

37. Make the diskette drive the active drive by typing the following at the DOS prompt:

    `A:` **<Return>**

    (If the diskette is in drive B, type **`B:`** **<Return>**)

38. Get the names of all of the logo, form, TIFF, setup, and font files that you want to download by listing the contents of the directory; at the DOS prompt type:

    `DIR` **<Return>**

    The downloadable files in the directory take the form *`file_name`*`.dwn` Write down the complete name of each file with the `.dwn` extension.

39. When you see “WAITING FOR FILE DOWNLOAD” on the LCD, release the **ON LINE** and **PAGE EJECT** keys, download the files to the printer by using the DOS `copy` command. Enter the following at the DOS prompt, for example:

    `copy /b file_name1.dwn+file_name2.dwn+... LPT1` **<Return>**

NOTE: The above command example assumes that LPT1 is used as the download port from the computer, and that the printer is already in download mode, waiting for file download, before you copy the files to the printer. If you are downloading the files using the LPT2 port on the computer, substitute “LPT2” for “LPT1” in the above commands.

40. While the files are being copied into memory, the printer LCD informs you of the load process and status. (Messages are listed in the table on page 3–60.)

41. Wait until the new files have successfully loaded into printer memory.

42. If you have any more software to install (logo, form, TIFF, setup, or font files), go back to step 32.

43. When all of the new software has successfully loaded into memory and the printer has reset itself, set the printer power switch to O (off).

44. Remove the diskette(s) from the computer and store them with the printer.

45. If you had to install a parallel data cable to the computer and printer in step , continue with step 46. If not, skip to step 51.

46. Unplug the printer AC power plug from its electrical outlet.

47. Power off the computer.

48. Disconnect the parallel data cable from the computer and from the printer.

49. Reconnect the data input cable(s) to the printer, if required.

50. Plug the printer AC power plug into its electrical outlet.

51. Set the printer power switch to | (on). If the printer is online, press the **ON LINE** key to place the printer on line. Press the **UP + DOWN** keys (or the key combination selected by the user) simultaneously to unlock the **ENTER** key.

52. Using the configuration printout you made in step 3, restore the printer configuration(s).

53. Press the **UP + DOWN** keys (or the key combination selected by the user) simultaneously to lock the **ENTER** key.

54. Press the **ON LINE** key to place the printer on line.

Table 3–1. Flash Messages

LCD Messages	Explanation	Required Action
CLEARING PROGRAM FROM FLASH	The program successfully loaded into printer RAM and the checksum matched. The printer is now deleting the old program from the flash file system.	None.
DIAGNOSTICS PASSED	The printer self-test has finished, and there were no errors.	None.
ERROR OCCURRED FLUSHING QUEUES *	An interim message that displays while the printer discards host data it cannot use because a fault condition exists. While this message displays, the asterisk (*) rotates.	Wait. When the asterisk (*) stops rotating, a different fault message will appear: troubleshoot the final message.
ERROR: DC PROGRAM NOT VALID	There is no emulation software installed in the DC flash memory, or the emulation software in the DC flash memory is corrupted.	Power off the printer and download the program again. If the message persists, contact service provider.
ERROR: DRAM AT ADDRESS *xxxxxxxx*	The printer found a defective DC DRAM memory location.	Contact service provider.
ERROR: FLASH TYPE IS NOT SUPPORTED	This type of flash memory SIMM is unsupported, or the file system in the DC flash memory is corrupted.	Power off the printer and download the program again. If the message persists, contact service provider.
ERROR: FLASH DID NOT PROGRAM	The printer encountered an error while trying to program the DC flash memory.	Power off the printer and download the program again. If the message persists, contact service provider.
ERROR: FLASH NOT DETECTED	The printer could not find any DC flash memory.	Contact service provider.
ERROR: NO DRAM DETECTED	The printer could not find any DC DRAM.	Contact service provider.

ERROR: NVRAM FAILURE	The non-volatile memory has failed.	Contact service provider. (Do NOT attempt to replace NVRAM.)
ERROR: PROGRAM NEEDS MORE DRAM	The printer requires more DC DRAM memory in order to run the downloaded program, or in order to use the downloaded files.	Use a smaller emulation program or have your service provider add DC DRAM to the controller board.
ERROR: PROGRAM NEEDS MORE FLASH	The printer requires more DC flash memory in order to run the downloaded program, or in order to use the downloaded files.	Optimize the flash file system. (See page 3–46.) If the message persists, use a smaller emulation program, or have your service provider add DC flash memory to the controller board.
ERROR: PROGRAM NOT COMPATIBLE	The downloaded program is not compatible with the printer.	Use the correct emulation software option(s) for this printer model.
ERROR: PROGRAM NOT VALID	The printer did not detect an emulation program in DC flash memory, or the emulation program in DC flash memory is present but corrupted.	Power off the printer and download the program. If the message persists, contact service provider.
ERROR: SECURITY PAL NOT DETECTED	The security PAL is not present or has failed.	Contact service provider
ERROR: SHORT AT ADDRESS *xxxx*	Hardware failure in DC DRAM or in controller board circuitry.	Contact service provider.
ERROR: WRITING TO FLASH	Hardware or software fault in DC flash memory.	Power off the printer and download the program again. If the message persists, contact service provider.
ERROR: WRONG CHECKSUM	The printer received the complete program or data file, but the checksum did not match. The data were corrupted during download.	Power off the printer and download the program again.

FILE EXISTS ENABLE OVERWRITE	The “Overwrite Files” menu selection is set to Disable, and you attempted to write to an existing file in the flash file system.	Enable the “Overwrite Files” menu selection. Then, try the operation again.
FILE SYS FULL ADD FLASH	The file to be stored in the flash file system is too big for the flash, even if you were to delete files from the file system and optimize the file system.	Have your service provider add more DC flash memory to the controller board, then optimize the flash file system. (Refer to page 3–46.) Finally, try the operation again.
FILE SYS FULL DELETE FILES	The file to be stored in the flash file system would either: exceed the available free space in the file system; or exceed the maximum number of files (144) that the file system can hold.	Delete one or more files from the flash file system. Then, optimize the flash file system. (Refer to page 3–46.) Finally, try the operation again.
FILE SYS FULL OPTIMIZE&REBOOT	There is insufficient free space in the flash file system to do the requested operation, and there are existing file(s) in the flash file system that have been marked for deletion.	Optimize the flash file system to delete the marked files, freeing the space they were occupying. (Refer to page 3–46.) Then, try the operation again.
FILE SYS INVALID OPTIMIZE&REBOOT	The flash file system is either invalid (corrupt) or not present. The cause can be either a program error or a hardware failure of the DC flash memory.	Reboot the printer several times. If the message persists, Contact service provider.
FILE SYS WRITE CHECK FLASH	One or more errors occurred while the printer was writing a file into the flash file system. The printer has marked the corrupt file for deletion. The cause can be data that became corrupted during download, or a hardware failure of the DC flash memory. **NOTE**: Although the corrupt file cannot be used, it still occupies space in the flash file system. To free this space, optimize the flash file system. (Refer to page 3–46.)	Optimize the flash file system to delete any marked files (refer to page 3–46), then retry the operation. (If you were downloading software, optimize the flash file system, then power off the printer and download the software again.) If the message persists after several tries, contact service provider.

INSUFFICIENT RAM REBOOT/ADD RAM	Before the printer can write a file into the flash file system, the file must be completely stored in the DC DRAM. In certain situations, there might be insufficient DRAM space for the file, especially when the printer has been operating for some time.	Reboot the printer to clear the DC DRAM. If the message persists, contact service provider.
LOADING FONTS	The printer is copying fonts from DC flash memory to DC DRAM.	None.
LOADING PROGRAM FROM PORT *xx*%	The printer is downloading the new program into printer RAM. *xx* indicates how much of the program has been downloaded.	None.
LOADING PROGRAM INTO FLASH	The printer has deleted the old program from the flash file system, and is now writing the new program into the flash file system.	None.
OPTIMIZING FLASH FILES	The printer is reclaiming unused space from deleted files in the flash file system.	None (wait for the printer to reboot).
RESETTING... PLEASE WAIT	The printer has finished writing the new program into the flash file system and is automatically resetting itself.	None.
SECURITY CODE VIOLATION	The software running or being downloaded does not match the security PAL code.	Contact service provider.
STANDBY...	The printer is performing internal initializations.	None.
TESTING HARDWARE PLEASE WAIT	The printer is running its hardware self-test.	None.
WAITING FOR PROGRAM DOWNLOAD	The printer is ready to receive the download data.	Start sending the file to the printer.

4 Diagnostics and Troubleshooting

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Printer Diagnostics

The printer includes self-diagnostic circuits and software to aid in the discovery, prevention, and correction of system problems and failures. Printer diagnostics fall into these categories:

- Off-line Diagnostics
- On-line Diagnostics

Off-Line Diagnostics

Most of the software diagnostics are executed under the following circumstances:

- The printer performs diagnostic routines when you request a configuration/test print via the control panel. The printout lists the current configuration of the printer. The test print also contains graphical content that demonstrates the quality of the image over the entire image area of the page.
- The printer performs a power-on self test each time the printer is powered on. During this test the printer will not produce a configuration/test print.

The power-on self test consists of the following:

- The printer controller self test:
  ROM Checksum
  Memory Test/Auto Configuration
  CPU Interrupts and I/O
- Control Panel Keys – Tests for keys that might be shorted.
- Print Engine FIFO – Checks for read/write errors.
- Engine Sensor Check – Scans engine status sensors including paper out, fuser temperature, toner level, cover/door interlocks, paper jam switches, waste toner container, and fuser cam motor.
- System Life Counts – Checks page count to verify that the OPC drum and the engine life counts have not been exceeded. The printer system counter, part of the OPC assembly, is reset when you replace the OPC.

On-Line Diagnostics

When on line, the printer continues to sense and report problems or conditions as they arise. Two categories of on–line error conditions exist: critical and non-critical.

The following critical errors stop the operation of the printer:

- Engine Sensor Checks – Scans engine status sensors including paper out, fuser temperature, toner level, cover interlocks, paper jam switches, and fuser cam motor
- Video Interface Error – Consists of interface protocol failures
- Optical System Errors – Includes beam detect, laser power, and mirror motor
- Toner Out
- Missing Components – Includes OPC drum unit and waste toner container

Non–critical errors allow the printer to continue to operate, but the LCD displays the conditions that exist. The following are non–critical errors:

- OPC Drum life exceeded
- EEPROM life exceeded
- Engine life exceeded

Running the Printer Test

This test checks both printer operation and the quality of printed output. If an error code is displayed, refer to “Error Messages” on page 4–4.

Following the procedure for the test print menu, starting on page 3–52, will produce a test print of the desired pattern. The test pattern and number of pages can be selected from this menu.

Hex Dumps

The hex dump option, outlined in the *Operator’s Guide*, allows you to place the printer in a mode in which the printer will output a hexadecimal data stream.

When enabled, the hex dump mode translates all host interface data to its hexadecimal equivalent, then prints the hex code and its printable symbol, if one exists. Figure 4–1 shows a partial example of a hex dump.

All characters printed after entering the hex dump mode (including any in the input buffer) are printed in two forms: as a two–symbol hexadecimal code and as its printable symbol, if any. A non–printable code is printed as a period [.] symbol. Up to 16 characters can be printed per line. No control codes will be acted upon by the printer while in hex dump mode.

The 16 characters are formatted so that the 16 printable symbols are printed in columns 1 through 16. The 17th column is blank. Column 18 contains either a “p”

(PI line active) or a blank (PI not active). Columns 19 and 20 contain the hexadecimal code for the first character, followed by a blank. The PI line condition and hexadecimal code for the second character is printed in columns 22, 23, and 24, followed by a blank. The hexadecimal code for the 16th character is printed in columns 78, 79, and 80.

Subsequent printing observes the current setting for skip–over perforation, form length, and top-of-form position parameters.

Cancel the hex dump mode (while off–line), by disabling it from the control panel. The paper then may be advanced to the next top–of–form.

If a fault occurs while printing a hex dump, the printer reverts to the normal fault state. When the fault is cleared, the printer resumes printing the hex dump (either a partial line with a form feed, or nothing at all). Top–of–form remains unaffected.

```
The Impact Print   54  68  65  20  49  6D  70  61  63  74  20  50  72  69  6E  74
er Emulation pri   65  72  20  45  6D  75  6C  61  74  69  6F  6E  20  70  72  69
nts in one–up, t   6E  74  73  20  69  6E  20  6F  6E  65  2D  75  70  2C  20  74
wo–up, and four–   77  6F  2D  75  70  2C  20  61  6E  64  20  66  6F  75  72  2D
up page windows,   75  70  20  70  61  67  65  20  77  69  6E  64  6F  77  73  2C
```

Figure 4–1. Example of Hex Dump

Error Messages

Operator Calls

This section provides a description of error messages that indicate possible printer problems. Note that these errors are warnings only and “call the operator” for the identified corrective action. These errors do not cause the print job to be lost. Once the corrective action has been taken, the printing will resume.

Message	Problem	Corrective Action
01 CLOSE THE COVER	The printer cover is open.	Close the cover.
02 LOAD PAPER	Printer is out of paper.	Load paper. Refer to page 2–15.
03 ADD TONER AND CHK WASTE BOTTLE	Printer is out of toner.	Add toner and check waste toner bottle level. Refer to the *Operator’s Guide.*

Message	Problem	Corrective Action
04 INSTALL TONER CUP	Toner waste bottle is not installed or not detected.	Install or reseat toner waste bottle.
05 INSTALL OPC DRUM	The OPC drum is not installed or not detected.	Install or reseat the OPC drum unit.
06 CLEAR PAPER JAM AT FUSER INPUT	Entry jam sensor is on.	Clear the paper jam. Refer to the *Operator's Guide.*
07 CLEAR JAM AT FUSER EXIT	Exit jam sensor is on.	Clear the paper jam. Refer to the *Operator's Guide*.
08 CLEAR JAM NEAR TOF LEVER	Jam occurred in paper path.	Clear the paper jam. Refer to the *Operator's Guide.*
O9 CHECK TOF LEVER	Top of form sensor malfunction.	Inspect top of form sensor lever and call service if necessary.
19 PAPER CTL ERR Reload Paper	A paper motion error has been detected.	Burst paper at tractors and reload paper. Refer to page 2–15.
34 REPLACE OPC DRUM Call Service	The OPC drum unit has exceeded its life of 30,000 printed pages.	Replace the OPC drum unit.

Critical Error Messages

This section describes error conditions that cause printing to stop. The corrective action in all cases is to first perform the reset function described in the *Operator's Guide*. If the printer reset does not solve the problem, cycle the printer power. If a reset or power cycle does not solve the problem, call your authorized service representative.

Message	Problem
15 FUSER FAIL Call Service	A rotation error of the pressure roller cam has occurred. There is an unfused image at the fuser.
16 FUSER FAIL Call Service	Pressure roller cam did not stop or is out of position after stop attempt or the sensor is bad.
17 FUSER FAIL Call Service	Pressure roller cam did not start or the sensor is bad.
18 FUSER FAIL Call Service	The sensor that detects the position of the speed control plate is defective.
23 THRMISTR FAIL Call Service	Thermistor wire broken.
24 THRMISTR FAIL Call Service	Thermistor shorted due to extraordinarily high temperature.
25 ENCODER FAIL Call Service	Defective or dirty encoder needs to be replaced.
26 HEATER FAIL Call Service	Fuser did not warm up within specified time.
27 HEATER FAIL Call Service	Fuser temperature not maintained during printing.
28 BEAM DET FAIL Call Service	Beam detect failure. Motor spinning but not generating interrupts.
29 LSU FAIL Call Service	No “ready” returned from LSU phase lock circuit.
30 LSU FAIL Call Service	LSU phase lock lost.
31 LSU FAIL Call Service	“Ready” returned from LSU phase lock circuit but LSU motor not enabled.
32 MISPRINT ERROR Call Service	Failed handshaking between engine and CPU controller board.
33 REPLACE EEPRM Call Service	Engine controller EEPROM has exceeded its life expectancy of 100,000 writes.
35 EC CKSUM FAIL Call Service	A checksum error occurred while reading the EEPROM on the engine controller board.

A Specifications

Original Manufacturer Supplies

Consumables design, specification, and selection are critical and integral to the development of any computer printer imaging system.

For the name of your nearest full service distributor, please call:

United States	(800) 733–1900
Europe	(33)1–46–25–1900
Singapore	(65) 546–4116

The yield of the supplies is based on a 5% page coverage using 20 lb bond paper. In a typical business letter, for example, text covers about 5% of the page using 20 lb bond paper. However, applications that print more densely, such as graphics and bar codes, will use up the consumables at a faster rate.

In addition, the type of media used will determine the yield of the consumables. Optimum print quality and consumable life is obtained by using bond media rated between 18 and 20 pounds. Label stock and heavier media can also be used, but the print quality and consumable life, as well as the life of the fuser, may be reduced.

Toner Kit (704539–006):

Cleaner Felt (2 per kit)	8,000 pages (see note below)
Toner Bottle (2 per kit)	8,000 pages (at 5% page coverage)
Waste Toner Container	8,000 pages
OPC Drum Unit (704539–008)	30,000 pages

Fuser Felt – (704539–011)

NOTE: Normally, the fuser cleaner felt should be replaced every 8,000 pages. However, to ensure optimum print quality, you may want to replace it more often (e.g., every 6,000 pages). Call the number shown above to order additional cleaner felts. They are available in 10–packs only. The part number for the 10–pack is 704539–011.

Developing Kit (704539–007):

Ozone Filter	100,000 pages
Developer Unit	100,000 pages
Starter Toner Bottle	200 pages
Cleaning Kit	

Fuser Assembly (see note below):

120V (704539–012):	300,000 pages
230V (704539–013):	300,000 pages

NOTE: If all printer consumables have been replaced and image defects and/or paper creases persist, the fuser may need to be replaced. The fuser is the unit that heats the toner so that it adheres to the paper. Contact your authorized service representative for fuser replacement.

Printer Engine:

120V	3.0 million pages
230V	3.0 million pages

Controller

The controller includes a 68040 32–bit microprocessor and comes standard with 8 MB of Flash Memory and 32 MB of DRAM memory. Optional Flash memory selections of 16 or 32 MB and an optional DRAM selection of 64 MB are available at time of order. The controller also includes a standard bi–directional parallel port which enables an Ethernet connection via PrintNet.

Electrical

Power Source	U.S. Domestic: 90 to 132 VAC/47 to 63 Hz European printers: 198 to 264 VAC/47 to 63 Hz
Type	Single Phase

Power Consumption

Operating Mode	1.5 kw (peak while fusing)
	1.0 kw (average while fusing)
Standby Mode	0.3 kw (average for 80° F ambient)
Energy Saving Mode	Less than 45w
Recommended Cooling	4000 BTU/hr @ 100% printing

Dimensions

Height	9.8 in. (25 cm)
Width	18.2 in. (46 cm)
Depth	19.3 in. (49 cm)
Weight	58 lb. (26.3 Kg)

Environment

Temperature	+50° to + 90° F
Humidity	20% to 85% RH, noncondensing
Altitude	Up to 7,500 ft.
Acoustic Noise	Less than 55 dBA (operating)

Printing

Speed	Up to 24 pages per minute
Technology	Laser diode electrophotography
Initialization	30 seconds
Warm-up	30 seconds

XSResolution	300 x 300 dpi

Interfaces

Standard	Centronics or IEEE 1284 Parallel
	RS–232 and RS–422 Serial
Optional	Dataproducts (requires cable adapter)
	Coax
	Twinax
	Ethernet via PrintNet

Emulations

Standard	Line Printer Plus or HP PCL5®
Optional	IGP/PGL and/or IGP/VGL
	LinePrinter Plus
	HP PCL5
	IPDS
	CTHI

Font and Character Sets

Printer emulation fonts and characters sets as well as custom fonts and scalable AGFA typefaces. The available fonts depend upon the emulation(s) installed.

Options

Printer Memory	Flash Memory: 8 (standard), 16, or 32 MB.
	DRAM: 32 (standard) or 64 MB.

Paper Stacker (with printer stand)	Power stacker, p/n 704539–001 (120V) p/n 704539–004 (230V), capable of holding and stacking an entire box of print media

B Host I/O Interfaces

The printer provides connections on the rear panel for the following host I/O interfaces:

- Centronics Parallel or IEEE 1284 Parallel Interface
- Dataproducts Parallel Interface
- Serial Interface (RS–232 or RS–422)
- PrintNet Ethernet Interface (if installed)
- Coax/Twinax Interface (if installed)

The parameters for each interface are selected through the control panel via the “Host Interface” menu as described in Chapter 3, “Configuring the Printer”. Interfaces are only simultaneously active if in Autoswitching.

The location of the interface connectors is shown on page 2–17 in Chapter 2, “Setting Up the Printer”.

You must supply the interface cable to connect the printer to your host computer. To facilitate the choice or manufacture of an interface cable for your application, pin assignments for the Centronics, Dataproducts, serial, and IEEE 1284 interfaces are provided in this appendix.

Centronics Parallel Interface

This interface enables the printer to operate with controllers designed for buffered Centronics printers. The interface is capable of transferring up to 200,000 characters per second. The maximum cable length from the controller (host computer) to the printer is 15 feet.

Centronics Interface Connector Pin Assignments

The printer provides a 36–pin D–shell connector on the rear panel for connection of a Centronics parallel interface cable. Table B–1 lists the pin assignments of the Centronics interface connector.

Table B–1. Centronics Parallel Interface Connector Pin Assignments

Input Signals		Output Signals	
Signal	**Pin**	**Signal**	**Pin**
DATA LINE 1	2	ACKNOWLEDGE	10
Return	20	Return	28
DATA LINE 2	3	SELECT	13
Return	21	Return	28
DATA LINE 3	4	PAPER EMPTY	12
Return	22	Return	30
DATA LINE 4	5	BUSY	11
Return	23	Return	29
DATA LINE 5	6	NFAULT	32
Return	24	Return	33
DATA LINE 6	7	PRIME	31
Return	25	Return	30
DATA LINE 7	8		
Return	26		
DATA LINE 8	9		
Return	27		
PAPER INST	15	Chassis GND	17
Return	29	+ 5 Volts	18
DATA STROBE	1		
Return	19		

Centronics Parallel Interface Signals

The Centronics interface signals are defined below.

PAPER EMPTY – A high true level from the printer to indicate the printer is in a fault condition.

SELECT – A high true level from the printer to indicate the printer is ready for data transfer and the ON LINE switch has been activated.

BUSY – A high true level from the printer to indicate the printer cannot receive data.

ACKNOWLEDGE – A low true pulse from the printer indicating the character or function code has been received and the printer is ready for the next data transfer.

DATA STROBE – A low true, 100 ns minimum pulse from the host to clock data into the printer.

DATA LINES – Eight standard or inverted levels from the host that define the data, which may consist of a character or function code. Sensing Data Line 8 is controlled by printer configuration.

PAPER INST – Optional VFU control signal from the host with the same timing and polarity as the data lines. PI line sensing is controlled by printer configuration.

PRIME – Optional low true signal from the host used to reset the printer to its default power–up state.

NFAULT – A low true signal from the printer to indicate the printer is in a fault condition.

NOTE: The PAPER INST line must be disabled (configuration option selected from the front panel) if the host does not drive or control it. If the line is not controlled by the host and sensing is enabled, rapid paper slewing will occur.

Centronics Parallel Interface Configuration

The printer is configured for the Centronics interface via the “Host Interface” menu as described in Chapter 3, “Configuring the Printer”. The following factory default interface configuration parameters may be modified to meet specific application requirements:

Data Bit 8	Enable
PI Ignored	Disable
Data Polarity	Standard
Resp. Polarity	Standard
Busy On Strobe	Enable
Latch Data On	Leading
Prime Signal	Enable
TOF Action	Reset
Buffer Size In K	64

Dataproducts Parallel Interface

This interface allows the printer to operate with controllers designed for Dataproducts printers. The interface is capable of transferring up to 500,000 characters per second. The maximum cable length from the controller (host computer) to the printer is 40 feet.

NOTE: Optional adapter cable (p/n 703316–001) and termination resistors RP1 330Ω (p/n 101381–331) and RP2 220Ω (p/n 101381–002) are required.

Dataproducts Interface Connector Pin Assignments

The printer provides a 36–pin D–shell connector on the rear panel for connection of a parallel interface cable. This 36–pin connector requires a cable adapter to convert it to a 50–pin AMP connector for Dataproducts compatibility. Contact the factory for the adapter (p/n 703316–001). Table B–2 lists the pin assignments of the Dataproducts cable adapter.

Table B–2. Dataproducts Parallel Interface Pin Assignments (Cable Adapter)

Input Signals		Output Signals	
Signal	**Pin**	**Signal**	**Pin**
DATA LINE 1	19	READY/FAULT	22
Return	3	Return	6
DATA LINE 2	20	ON LINE/SELECT	21
Return	4	Return	5
DATA LINE 3	1	DATA REQUEST/ACK	23
Return	2	Return	7
DATA LINE 5	34	Interface Verif.	45, 46
Return	18		
DATA LINE 6	43	PAPER INST	30
Return	42	Return	14
DATA LINE 7	36		
Return	35		
DATA LINE 8	28		
Return	44		
DATA STROBE	38		
Return	37		

NOTE: The printer comes standard with 470/1K ohm terminator resistors. Verify host computer port termination resistor requirements. In most cases, Dataproducts requires 220/330 ohm termination resistors. Optional termination resistors are available from your service provider.

Dataproducts Parallel Interface Signals

The Dataproducts interface signals are defined below.

READY – A high true signal from the printer indicating AC power and DC voltages are present, paper is loaded properly, and the printer is not in a fault condition.

ON LINE – A high true signal from the printer indicating the Ready Line is true and the ON LINE switch on the control panel has been activated. The printer is ready to accept data from the host.

DATA REQUEST – A high true signal from the printer to synchronize host data transmission with printer timing. This signal goes true when the printer is ready to receive data. It changes to the false state shortly after the leading edge of the data strobe signal.

DATA STROBE – A high true pulse from the host to indicate that data is ready. The data strobe must remain high at least until the Data Request line goes false.

DATA LINES – Eight standard or inverted levels from the host that specify character data, plot data, or a control code. Sensing Data Line 8 is controlled by printer configuration.

PAPER INST – Optional standard or inverted level VFU signal from the host with the same timing and polarity as the data lines. PI line sensing is controlled by printer configuration.

NOTE: The PAPER INST Line must be disabled (configuration option selected from the front panel) if the host computer does not drive or control the PI Line. If the line is not controlled by the host and sensing is enabled, rapid paper slewing will occur.

Interface Verification – Two pins on the interface connector jumpered together allow you to verify proper installation of the interface connector.

Dataproducts Parallel Interface Configuration

The printer is configured for the Dataproducts interface via the “Host Interface” menu as described in Chapter 3, “Configuring the Printer”. The following interface configuration parameters may be modified to meet specific application requirements:

Data Bit 8	Enable
P I Ignored	Enable
Data Polarity	Standard
Resp. Polarity	Standard
Latch On Data	Middle
Prime Signal	Disable
TOF Action	Reset
Buffer Size In K	64

* = Factory default setting

Termination Resistors

For parallel interface configurations, the printer is equipped with 470/1K ohm pullup/pulldown terminating resistors located on the printer motherboard.

Generally, these terminating resistors are suitable for most applications. If, however, the standard terminating resistor pack is not compatible with the particular interface driver requirements of your host computer, other values or combinations of pullup/pulldown resistors may be necessary.

If you are experiencing communication problems between the printer and host; such as double characters, incorrect characters, or loss of data, the cause may be the value of the termination resistors on the motherboard. Contact your authorized service representative for instructions on replacing the termination resistors.

Table B–3. Dataproducts Parallel Interface Termination Resistors

Part Number	Description	Main Controller Location
101381–331	330Ω Pull Up Resistor	RP1
101381–002	220Ω Pull Down Resistor	RP2

RS–232 Serial Interface

This interface is used with bit serial devices compatible with EIA® RS–232E or CCITT V.24 standards. The interface circuit characteristics are compatible with the Electronic Industry Association Specification.

The printer is configured as Data Terminal Equipment (DTE).

The serial data transfer baud rate is selectable from the control panel. The input format consists of a single start bit, 7 or 8 data bits, and one or two stop bits. The operator can set the number of data bits from the control panel. The data bits are interpreted with the least significant bit first. The operator can also set parity checking via the control panel. The printer interface uses a first–in/first–out buffer with the size selectable from the control panel. The asynchronous interface accepts data as it is provided by the host computer.

The maximum cable length from the host computer to the printer is 50 feet.

RS–232 Interface Connector Pin Assignments

The printer provides a 25–pin DB–25S connector on the rear panel for connection of a serial interface cable. Table B–4 lists the pin assignments of the RS–232 interface connector.

Table B–4. RS–232 Serial Interface Pin Assignments

Pin	Signal	Direction
1	Chassis Ground	Not applicable
2	Transmit Data (TxD)	From printer
3	Receive Data (RxD)	To printer
4	Request To Send (RTS)	From printer
5	Clear To Send (CTS)	To printer
6	Data Set Ready (DSR)	To printer
7	Signal Ground	Not applicable
8	Carrier Detect (CD)	To printer
11, 14	Reverse Channel (RC) (no connects)	From printer
20	Data Terminal Ready (DTR)	From printer

RS–232 Serial Interface Signals

The RS–232 serial interface signals are defined below.

Receive Data (RxD) – Serial data stream to the printer.

Transmit Data (TxD) – Serial data stream from the printer for transmitting status and control information to the host. Subject to protocol selection.

Request To Send (RTS) – Control signal from the printer. Subject to configuration.

Clear To Send (CTS) – Status signal to the printer indicating the host is ready to receive data/status signals from the printer. When CTS is enabled, DSR and CTS must both be asserted for the printer to transmit flow control characters to the host.

Data Set Ready (DSR) – Status signal to the printer indicating the host is in a ready condition. DSR is ignored unless CTS or CD are enabled.

Carrier Detect (CD) – Status signal to the printer. The ON condition is required for the printer to receive data. Available as a configuration setup option. When CD is enabled, the host must assert both DSR and CD for the printer to accept data.

Data Terminal Ready (DTR) – Control signal from the host to the printer. When enabled, the host will activate the data channel. Subject to configuration.

RS–232 Serial Interface Configuration

The printer is configured for the RS–232 serial interface via the “Host Interface” menu as described in Chapter 3, “Configuring the Printer”. The following interface configuration parameters may be modified to meet specific application requirements:

Host Protocol	XON/XOFF
Baud Rate	9600
Data Word Length	8 Data Bits
Stop Bits	1 Bits
Parity	None
Data Term Ready	True
RTS Function	Online and BNF
Buffer Size In K	64
Poll Character	0
Poll Response	0 MS

Idle Response	Disable
One Char Enquiry	Disable

NOTE: Only the factory default setting is shown above. Refer to the "Configuring the Printer" chapter for additional options.

RS–422 Serial Interface

This interface is used with bit serial devices compatible with EIA RS–422B or CCITT V.27 and V.11 standards. The interface circuit characteristics are compatible with the Electronic Industry Association Specification.

The printer is configured as Data Terminal Equipment (DTE).

The serial data transfer baud rate is selectable from the control panel. The input format consists of a single start bit, 8 data bits, and one stop bit. The operator can set the number of data bits from the control panel. The data bits are interpreted with the least significant bit first. The operator can also set parity checking via the control panel. The printer interface uses a first–in/first–out buffer with the size selectable from the control panel. The asynchronous interface accepts data as it is provided by the host computer.

The maximum cable length from the host computer to the printer is 400 feet.

RS–422 Interface Connector Pin Assignments

The printer provides a 25–pin DB–25S connector on the rear panel for connection of a serial interface cable. Table B–5 lists the pin assignments of the RS–422 interface connector.

Table B–5. RS–422 Serial Interface Pin Assignments

Pin	Signal	Direction
1	Chassis Ground	Not applicable
25	Transmit Data + (TxD+)	From printer
19	Transmit Data – (TxD–)	From printer
17	Receive Data + (RxD+)	To printer
15	Receive Data – (RxD–)	To printer
7	Signal Ground	Not applicable

RS–422 Serial Interface Signals

The RS–422 serial interface signals are defined below.

Received Data (RxD) – Serial data stream from the host to the printer.

Transmitted Data (TxD) – Serial data stream from the printer to the host. Subject to protocol selection.

RS–422 Serial Interface Configuration

The printer is configured for the RS–422 serial interface via the “Host Interface” menu as described in Chapter 3, “Configuring the Printer”. The following interface configuration parameters may be modified to meet specific application requirements:

Host Protocol	XON/XOFF
Baud Rate	9600
Word Length	8 Data Bits
Stop Bits	1 Bit
Parity	None
Data Term Ready	True
RTS Function	Online and BNF
Buffer Size In K	64
Poll Character	0
Poll Response	0 MS
Idle Response	Disable
One Char Enquiry	Disable

NOTE: Only the factory default setting is shown above. Refer to the “Configuring the Printer” chapter for additional options.

IEEE 1284 Parallel Interface

IEEE 1284 Parallel Interface Configuration

The printer is configured for the IEEE 1284 interface via the IEEE 1284 Interface menu. The following interface configuration parameters may be modified to meet specific application requirements:

Prime Signal	Enable
TOF Action	Reset
Buffer Size In K	64

The 1284 supports three operating modes which are determined by negotiation between the printer and the host.

Compatibility Mode

This mode provides compatibility with Centronics-like host I/O. Data is transferred from the host to the printer in 8-bit bytes over the data lines.

Compatibility Mode can be combined with Nibble and Byte Modes to provide bidirectional communication.

Nibble Mode

Eight bits equals one Byte. When a byte of data is sent to the printer, the eight bits are sent over eight data lines.

Some devices cannot send data over their eight data lines. To bypass this, the 1284 permits data to be sent as half a byte over four status lines. (Half a Byte equals one nibble.) Two sequential four-bit nibbles over the status lines, and the host controls the transmission.

Byte Mode

The printer and host send data to each other along eight data lines (one bit per line).

If bidirectional communication is supported by the printer and the host, the host will take control of the data transfer.

Signals

Table B–6 lists which of the signals is associated with the corresponding pins on the 1284 interface. Descriptions of the signals follow.

Table B–6. RS–422 Serial Interface Pin Assignments

Pin	Source of Data	Type of Mode		
		Compatible	Nibble	Byte
1	Host	nStrobe	HostClk	Host/Clk
2	Host/Printer	Data 1 (LSB)		
3	Host/Printer	Data 2		
4	Host/Printer	Data 3		
5	Host/Printer	Data 4		
6	Host/Printer	Data 5		
7	Host/Printer	Data 6		
8	Host/Printer	Data 7		
9	Host/Printer	Data 8 (MSB)		
10	Printer	nAck	PtrClk	PtrClk
11	Printer	Busy	PtrBusy	PtrBusy
12	Printer	PError	AckDataReq	AckDataReq
13	Printer	Select	Xflag	Xflag
14	Host	nAutoFd	Host Busy	Host Ack
15		Not Defined		
16		Logic Grid		
17		Chassis Grid		
18	Printer	Peripheral Logic High		
19	Printer	Signal Ground (nStrobe)		
20	Printer	Signal Ground (Data 1)		
21	Printer	Signal Ground (Data 2)		
22	Printer	Signal Ground (Data 3)		
23	Printer	Signal Ground (Data 4)		
24	Printer	Signal Ground (Data 5)		
25	Printer	Signal Ground (Data 6)		

Pin	Source of Data	Type of Mode		
		Compatible	Nibble	Byte
26	Printer	Signal Ground (Data 7)		
27	Printer	Signal Ground (Data 8)		
28	Printer	Signal Ground (PError, Select, nAck)		
29	Printer	Signal Ground (Busy, nFault)		
30	Printer	Signal Ground (nAuto, nSelectIn, nInit)		
31	Printer	nInit		
32	Printer	NFault	nDataAvail	aDataAvail
33	Printer	Not Defined		
34	Printer	Not Defined		
35	Printer	Not Defined		
36	Printer	nSelectIN	1284 Active	1284 Active

NOTE: The length of the data cable from the host computer to the printer should not exceed 10 meters (32 feet).

Host Clock / nWrite. Driven by host. Data transferred from host to printer. When printer sends data, two types are available: in Nibble Mode (signal is set high) or in Byte Mode (signal is set low).

Data 1 through Data 8. These pins are host-driven in Compatibility Mode and bidirectional in Byte Mode. They are not used in Nibble Mode. Data 1 is the least significant bit; Data 8 is the most significant bit.

Printer Clock / Peripheral Clock / Interrup. Driven by the printer. A signal from the printer indicating the character or function code has been received and the printer is ready for the next data transfer.

Printer Busy / Peripheral Acknowledge / nWait. Driven by the printer. Indicates that the printer cannot receive data. (Data bits 4 and 8 in the Nibble Mode.)

Acknowledge Data Request / nAcknowledge / nWait. Driven by the printer. Indicates that the printer is in a fault condition. (Data bits 3 and 7 in Nibble Mode.)

Xflag. Driven by the printer. A high true level indicating the printer is ready for data transfer and the printer is on-line. (Data bits 2 and 6 in Nibble Mode.)

Host Busy / Host Acknowledge / NDStrobe. Driven by the host. Activates auto–line feed mode.

Peripheral Logic High. Driven by the printer. When the line is high, the printer indicates all of its signals are in a valid state. When the line is low, the printer indicates its power is off or its signals are in an invalid state.

nReverse Request. Driven by the host. Resets the interface and forces a return to Compatibility Mode idle phase.

nData Available/ nPeripheral Request. Driven by the printer. Indicates the printer has encountered an error. (Data 1 and 5 in Nibble Mode.)

1284 Active nAStrobe. Driven by the host. A peripheral device is selected.

Host Logic High. Driven by the host. When set to high, the host indicates all of its signals are in a valid state. When set to low, the host indicates its power is off or all of its signals are in an invaild state.

nINit. Resets init interface from the host.

Diagnostic Port

This interface is used for connection with a computer port to run diagnostic tests using software driven diagnostics. The connections, with a six pin RJ-11 connector, are made as shown in Figure B–1 and Table B–7.

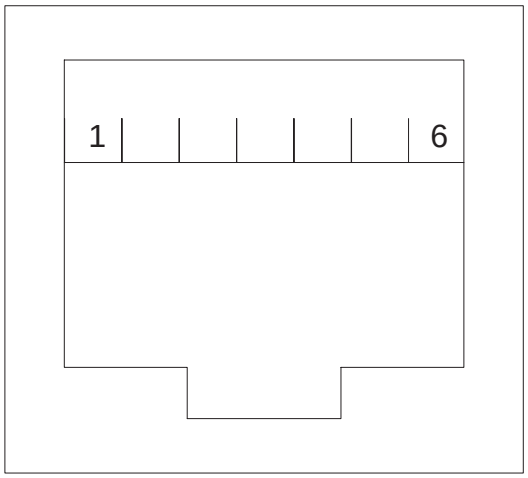

Figure B–1. Diagnostic Port

Table B–7. Diagnostic Port Interface Pin Assignments

Pin	Signal	Direction
1	No Connection	
2	RX	To Printer
3	GND	
4	TX	From Printer
5	Ground	
6	No Connection	

C Media Requirements

The printer requires continuous form electrographic grade media with 0.5 inch pitch tractor feed pin holes. The media capabilities and requirements are listed below:

Width	4.0 to 10.0 inches edge to edge (3.5 to 9.5 inches pin to pin)
Length	3.0 to 33.0 inches in 1/8 or 1/6 inch increments
Weight	18 to 42 lb. bond (67 to 158 g/m^2) 110 lb. tag stock 99 lb. card stock
Labels:	
Face Stock	40 to 60 lb. book stock (60 to 90 g/m^2)
Carrier	50 lb. book stock (75 g/m^2)
Adhesive	acrylic
Cut to Tie (page perf)	≥ 2.9:1 (8 cuts/inch) bond (and microperf) ≥ 6.5:1 (4 cuts/inch) tag/card stock ≥ 6.5:1 (4 cuts/inch) label stock
Percent Recycled paper	20% maximum
Moisture Content	5% ± 1%
Resistivity	10^8 to 10^{12} ohms

NOTE: Bond paper weight based on 17 X 22 inch base size. Tag stock based on 24 X 36 inch base size. Card stock based on 22 1/2 X 28 1/2 inch base size. Book carrier stock based on 25 X 38 inch base size.

Glossary

ACIA — *Acronym for* **A**synchronous **C**ommunication **I**nterface **A**dapter.

baud — A unit of speed that measures the rate at which information is transferred. Technically, baud rate is the reciprocal of the length in seconds of the shortest pulse used to carry data. For example, a system in which the shortest pulse is 1/1200 second operates at 1200 baud. On RS–232 serial lines, the baud rate equals the data flow rate in bits per second (bps). To communicate properly, a printer must be configured to operate at the same baud rate as its host computer.

bit — *Contraction of* **b**inary dig**it**. A digit in the binary (base 2) number system: 0 or 1. A bit is the smallest unit of storage in a digital computer, where 0 and 1 are represented by different voltages. Groups of bits forms other units of storage called *nibbles*, *bytes*, and *words*.

Boot-up — The start-up procedure which causes a computer operating system to be loaded into main memory.

buffer — A reserved area in memory. Data are written to and read from the buffer during data transfers.

charger — The charge corona applies a high negative charge to the surface of the photoconductor belt.

coax — Coaxial cable. A type of cable with a single wire surrounded by insulation and a braided shield.

configuration — The act of setting a bunch of electrical and data control options on a printer so that a computer and the printer can “talk” to each other. When properly configured, a printer can receive data from the computer, print the data, and send and receive control signals.

controller — An independent functional logic unit in a data processing system that controls data paths between one or more units of peripheral equipment.

data bits — Binary information sent to the printer; a character set grouping containing letters, digits, and punctuation marks to be printed.

default	A value, parameter, attribute, or option that is assigned by a program or system when another has not been specified by the user.
developer	The developer unit uses the toner and carrier particles to produce a developed image onto the surface of the photoconductor belt.
diagnostic	Pertaining to the detection and isolation of a printer malfunction or mistake.
diskette	A thin, flexible magnetic disk containing software such as test and diagnostic programs, initialization files, and all font specifications for the printer.
electrophotographic	A non-impact printing process in which electrical charges and heat are used to transfer and fuse images to paper, as opposed to impact printing, in which hammers or pins drive an inked ribbon onto paper to form characters.
emulation	Refers to the ability of a printer to execute the commands of another printer protocol.
fuser	The fuser unit uses heat and pressure to bond the toner to the surface of the paper.
host computer	The computer that stores, processes, and sends data to be printed, which communicates directly with the printer. The term “host” is used to indicate the controlling computer, since modern printers are themselves microprocessor-controlled computer systems.
interface	The hardware component used to link two devices by common physical interconnection, signal, and functional characteristics.
LSU	*Acronym for* **L**aser **S**canning **U**nit. The beam of the laser scanning unit shines on a rotating polygonal mirror which causes the beam to scan across the OPC drum.
logical link	The parameters that specify data transfer, data control, and/or data communication operations.
macro	A macro is a collection of control codes, escape sequences, and data whose execution can be initiated by using a single command. This information is downloaded into the printer.

MPP	*Acronym for* **M**aximum **P**rint **P**osition. Also known as line length.
NMI	*Acronym for* **N**on-**M**askable **I**nterrupt.
non impact	Printing which does not result from any mechanical impact onto the paper. Example: an electrophotographic printer.
OPC	The material of the OPC drum is an insulator when in the dark and is conductive when exposed to light.
operating system	A collection of programs that control the overall operation of a computer system.
parity (check)	Parity checking is the addition of a non–data bit to data, resulting in the number of “1 bit” being either always even or always odd. Parity is used to detect transmission errors. Parity represents value in the check digit of the received or transmitted data.
PCB	*Acronym for* **P**rinted **C**ircuit **B**oard. A PCB is an insulating board on which circuit paths have been printed or etched.
PCBA	*Acronym for* **P**rinted **C**ircuit **B**oard **A**ssembly.
port	A data channel used for receiving data from or transmitting data to one or more external devices.
protocol	The rules and conventions that govern communication between a printer and a host computer. A protocol includes codes for printing text and graphics and codes instructing the printer to perform special operations.
RAM	*Acronym for* **R**andom **A**ccess **M**emory. Can be read from or written to at any time. RAM is volatile: Whatever is in RAM is lost when power is turned off.
read	To retrieve data from memory or mass storage (hard disk, floppy diskette, etc.).
resolution	A measure expressing the number of component units in a given range used to create an image; in printing, expressed as the number of dots per inch (dpi) horizontally and vertically.
ROM	*Acronym for* **R**ead **O**nly **M**emory. Programs, instructions, and routines permanently stored in the printer that cannot be written to. Files in ROM are not lost when power is turned off.

	(ROM–resident fonts are fonts permanently stored in a printer and available at any time via software commands.)
stop bits	The signal which indicates the end of a character or element.
toner	A fine, negatively-charged, black, powdery substance used to develop an image.
toner cartridge	Contains the toner (ink) that will be used to make marks on the paper.
transfer corona	The transfer corona causes the developed image to be attracted away from the photo-conductor belt and placed onto the surface of the paper.
twinax	Twinaxial. A type of cable with two wires surrounded by insulation and a braided shield.
write	To place data in memory (RAM, NVRAM) or in mass storage (hard disk, floppy diskette, etc.).

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PRINTRONIX, INC.
16400 MYFORD ROAD
P.O. BOX 19559
IRVINE, CA 92623–9559
PHONE: 714/368–2300
FAX: 714/368–2600
CUSTOMER SOLUTIONS CENTER: 714/368–2686

PRINTRONIX
NEDERLAND BV
P.O. BOX 163, NIEUWEWEG 283
NL–6600 AD WIJCHEN
THE NETHERLANDS
PHONE: (31) 24 6489489
FAX: (31) 24 6489499

PRINTRONIX SCHWEIZ GMBH
42 CHANGI SOUTH STREET 1
CHANGI SOUTH INDUSTRIAL ESTATE
SINGAPORE 486763
PHONE: (65) 542–0110
FAX: (65) 543–0220

VISIT OUR WEBSITE AT:
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